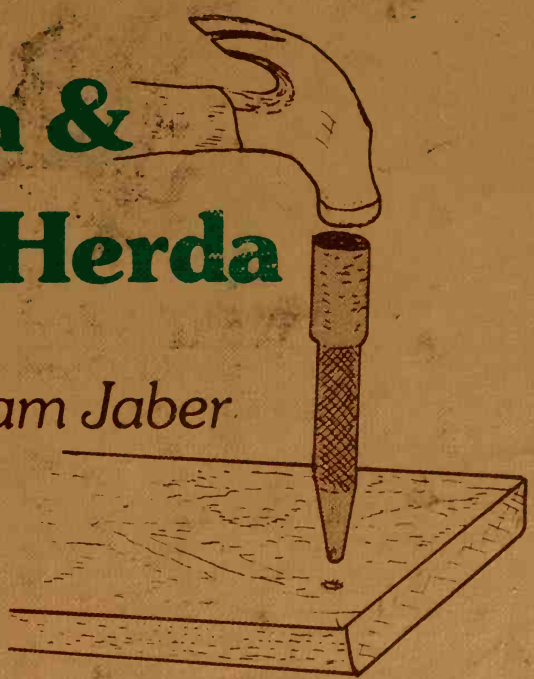
Carpentry for Kids

D.J. Herda &
Judy Bock Herda

Drawings by William Jaber



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JULIAN MESSNER  NEW YORK

Published by Julian Messner, a Simon & Schuster
Division of Gulf & Western Corporation, Simon &
Schuster Building, 1230 Avenue of the Americas,
New York, N.Y. 10020.

Manufactured in the United States of America

Design by Elizabeth Woll

Library of Congress Cataloging in Publication Data

Herda, DJ
Carpentry for kids.

Includes index.
SUMMARY: An introduction to carpentry including
information on sources, types, and sizes of wood,
basic hand and power tools, fasteners, and finishes.
Includes instructions for easy projects.
1. Carpentry—Juvenile works. [1. Carpentry.
2. Handicraft] I. Herda, Judy Bock, joint author.
II. Jaber, William. III. Title.
TH5607.H47 684'.08 79-26793
ISBN 0-671-33042-X

orig.

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Carpentry for Kids

1

In The Beginning

THE EARLIEST CAVEMEN became carpenters when they started to build shelters of broken sticks and twigs. Carpentry as we know it today probably began in the early age of metals, several thousand years ago. The first crudely fashioned tools were made of bronze and iron and permitted humans to cut the wood they used to make things, rather than having to break it.

Glue was made in those early times by boiling down the bones, skins, and hooves of various animals. The use of glue meant the carpenter could make more elaborate things.

By the year 1,300 B.C., when the famed King Tutankhamen ruled Egypt, the art of carpentry was highly developed. Elaborate, carved pieces of furniture were

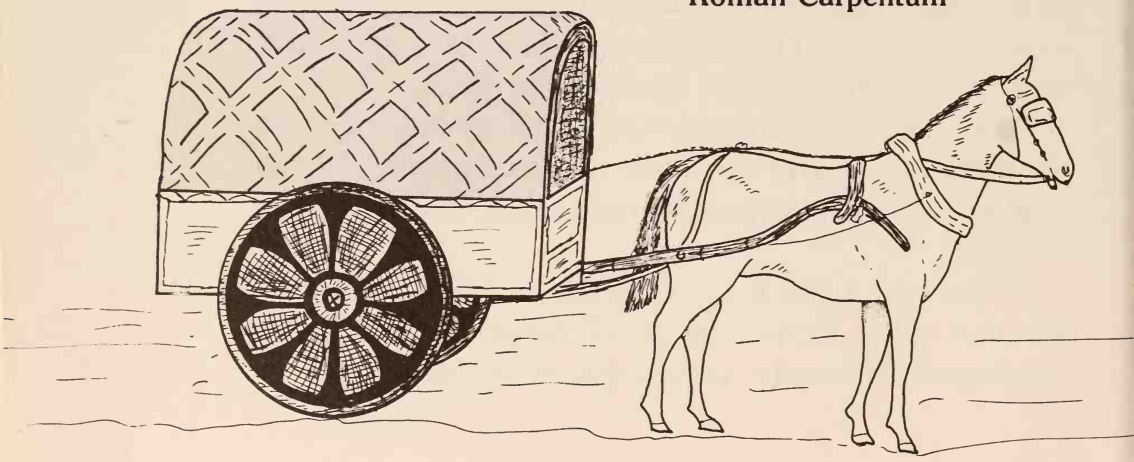
found among the treasures sealed with the king in his tomb.

In the eighteenth century, the American colonists used tools which they considered the latest in modern design. Yet these tools were basically unchanged from ancient Roman times. And many ancient Roman tools greatly resembled those used in still earlier times in Greece, Egypt, and China.

Even today, such tools as the plane, used for trimming the edges of wood, are very similar in appearance and use to planes of the days of the Roman Empire. However, today's planes are usually constructed of metal instead of wood.

The word "carpenter" comes from the Latin spoken by ancient Romans. "Carpentum" means a two-wheeled Celtic cart which the ancient Romans greatly admired.

Roman Carpentum



This carpentum was made of wood by craftsmen who came to be known as carpenters.

In colonial America, nearly every male colonist was his own carpenter, building his own shelter and furniture. As colonial communities grew larger in size, some people who were handier with tools than others sold their services as carpenters.

As the field of carpentry developed, so did the methods for turning trees into lumber. In the eighteenth century, sawmills began using water power instead of manpower to cut mighty trunks of trees into planks for building. Later in that century, the sawmill gave way to the faster and more accurate circular saw and, in the nineteenth century, to the band saw. As fast as lumberjacks could fell the trees, mills turned them into planks of many kinds and sizes.

The industrial revolution of the nineteenth century also brought mechanical power to carpenters' tools. The field of carpentry boomed.

While the early carpenters worked almost exclusively with wood, today's professional carpenters rely on other materials, like metals and plastics.

And today, not everyone who works with wood is considered a carpenter. Those who specialize in constructing furniture, for instance, are called cabinetmakers. Those who concentrate on building stairs and fitting a house with interior trim are known as millmen. The carpenter is considered someone who does general woodwork. In small, rural communities, these various jobs are less strictly defined, so a carpenter might be

called upon to do several jobs that in larger cities would be done by other tradespeople.

Becoming a professional carpenter is no easy matter. Where once a person had only to acquire the skill and the tools today a carpenter must be skilled in many areas of the industrial arts and needs a high school education.

A person can become an apprentice carpenter under a work-study agreement with a particular employer. After completing several years of apprenticeship and passing the required examinations, he or she may become a journeyman carpenter, and perhaps advance to foreman, contractor, and even architect.

2

The Lumberyard— and Other Sources of Wood

SOMETIMES IT'S FUN to pick up a scrap of wood and begin cutting and hammering to see what you come up with. More often, though, you'll want to follow a pattern or plan in order to end up with something useful and well-designed. That's why we've included a number of project plans later in this book.

After you decide on a special project you want to build, you'll need to gather up the necessary materials. Particular plans usually call for specific sizes and amounts of wood. (For example: two 2″ × 4″ boards ten feet long, or one nine-square-inch sheet of plywood.)

When working without a plan, or when the plan doesn't list materials you need, you may have to do some estimating, possibly with the help of a salesperson at a nearby lumberyard. Most lumberyard estimators per-

form a number of jobs, from finding the size and type of nail you need to ringing up the actual sale and telling you how much money you owe.

In this chapter, we'll look more closely at the lumberyard and how you can benefit from it, and we'll look at other sources of wood as well.

THE LUMBERYARD

The lumberyard was originally named because it was a storage area for cut lumber. Before lumberyards existed, a person wanting wood for building had to go to a lumberjack who was trained to cut trees. Then the wood was taken to a mill where it was sliced into boards. Or else, a person had to do all this himself.

Today, lumber is just one of many things a lumberyard sells. All lumberyards carry a wide range of fasteners like nails, screws, bolts and nuts, corner clamps, and so forth (we'll talk more about them later). In addition, many modern lumberyards are really more correctly described as building centers because they carry glue, tar, cement, gravel, wire, chains, rubber hose, plastic sheets, insulation, putty, paint, and much, much more. In fact, if you need just about anything necessary to build something, chances are good you'll find it at the lumberyard.

How do you find your way around a lumberyard? It's easiest just to go to the main office with a list of materi-

als you need (or at least a sketch or plan of the thing you want to build) and ask for help in locating the materials. You may find in larger lumberyards that various materials are kept in different buildings, which may spread across a city block or more. Trying to find the materials you need without someone's help will be like looking for a flea in a coal bin.

How can you find the nearest lumberyard? The best way is to check the telephone directory yellow pages under "lumber." Or, if you know a carpenter or even a neighbor who builds things, ask where to buy materials.

TYPES OF WOOD

You may not have realized it, but there are many different types of wood available at lumberyards. Each type of wood has its own characteristics. Pine, for example, is a grainy, knotty, rugged-looking wood that is soft and, thus, easy to cut and work with. Mahogany or cherry, on the other hand, has a finer grain and looks more delicate. It's a harder wood, too . . . harder to cut and nail.

In general, all wood is classified as either hardwood (like oak and cherry) or softwood (like pine, spruce, and cedar). Hardwood comes from deciduous trees—trees that shed their leaves in cold climates in winter. Softwood come from needleleaf evergreen trees that

maintain their needles all year long. But not all softwoods are soft, and not all hardwoods are hard, so don't get fooled by the classification.

But isn't all wood pretty hard? Yes—to a point. But if you take your fingernail and press it into the edge of some woods, like certain kinds of pine, you'll leave a mark. Do the same with a different kind of pine or an oak board, and you won't make a dent. The *durability* of wood is its ability to stand up to abuse. It is one of the major reasons some people prefer hardwood to softwood—especially when building such items as tables and chairs which are likely to receive plenty of bumps and bruises. The durability of wood is something for you to consider before going to the lumberyard to buy the materials you'll need for a specific project.

Another reason some people prefer hardwood to softwood is *grain*—the wood's natural markings. Hardwood generally accepts wood *stain*, or coloring, very well, showing off the wood's grain evenly. Softwood sometimes stains unevenly, resulting in a blotchy looking project.

Of course, you may not be planning on staining your project (we'll talk more about wood stains in a later chapter). But if you are painting the wood, not staining it, you should buy the least expensive wood that will meet your project's requirements. The most beautiful grain in the world means nothing when it's buried beneath two coats of paint!

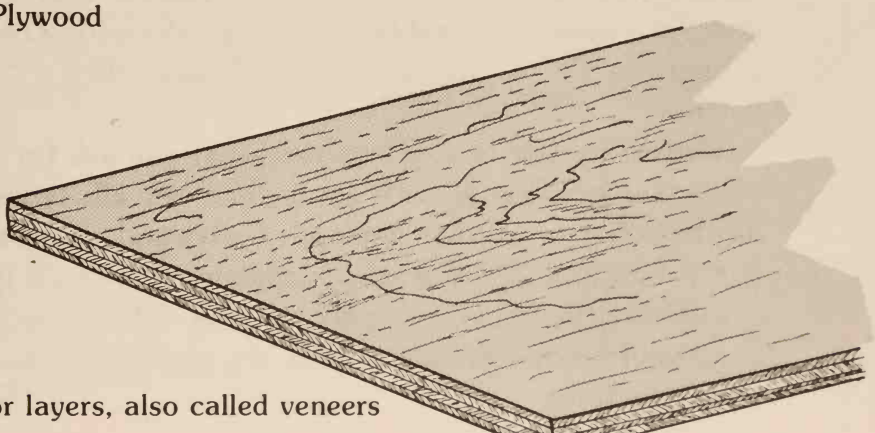
Besides hardwood and softwood, most lumberyards sell other types of wood as well. These include veneer

wood, like plywood and man-made wood, like pressboard or hardboard.

Plywood is a relatively inexpensive type of wood that comes in large sheets. Each sheet is actually made up of several thinner sheets of wood, called *veneers*, which are glued together and held under pressure until dry. The result is a very durable sheet of wood that's strong, yet comparatively inexpensive. Plywood usually comes in sheets measuring 4 × 8 feet and from 1/4" to 1¼" thick (the thicker the plywood, the more expensive it will be).

Plywood comes in three grades: rough, finish, and exterior. The rough grade is pretty much what the name infers—a rough-to-the-touch, knotty, wood whose biggest appeal is its low cost. Finish plywood is smoother and has a nicer overall appearance for staining or leaving unfinished. It costs more than rough wood. Exterior plywood is a specifically made plywood for use outside

Plywood



Note plies or layers, also called veneers

or where moisture is present. It's glued together with waterproof adhesive that won't allow the veneers to separate or buckle if the wood gets wet.

Another type of wood commonly available at lumberyards is called pressboard or hardboard. Like plywood, it is sold in panels measuring usually 4 × 8 feet and in widths from 1/8″ up. But unlike plywood, hardboard is made from pulp and chips of wood compressed and dried into a single sheet. Hardboard is by its nature resistant to moisture, but only a certain kind, called tempered hardboard, is recommended for outdoor projects or in damp locations.

SIZES OF WOOD

Not too many years ago, when a carpenter walked into a lumberyard and asked for an eight-foot 2″ × 4″, he received an eight-foot piece of lumber measuring two inches wide by four inches deep. Today, that same order for lumber would bring an eight-foot-long board measuring 1¾″ × 3½″, and—yet, it's still called a "two-by-four."

The difference in size between what you ask for and what you get occurs with some, but not all, types of lumber. If you ask for a sheet of plywood measuring 4 × 8 feet and ¼″ thick, that's exactly what you'll get.

Luckily, the measurements are not difficult where lengths of lumber are concerned. An eight-foot board is eight feet long.

Obviously, you have to be careful in buying lumber to make sure what you *think* you're getting is actually what you *are* getting. The only way to know for sure is to ask your salesperson the *actual* measurements of the lumber you're buying.

There's one last point to consider when buying lumber from a lumberyard. Wood is affected by moisture. That means it absorbs moisture and can swell and bend, or warp, and so be spoiled for most uses. This is true especially with softwoods like pine, and with wood that has been stored for long periods outdoors or under a leaky roof. Leaky roofs are very common at many lumberyards.

If your building project calls for two pieces of lumber butting up against one another, or if you need a perfectly flat sheet of wood as the top of a table, and the wood you buy is warped—you're going to have trouble.

Straight board

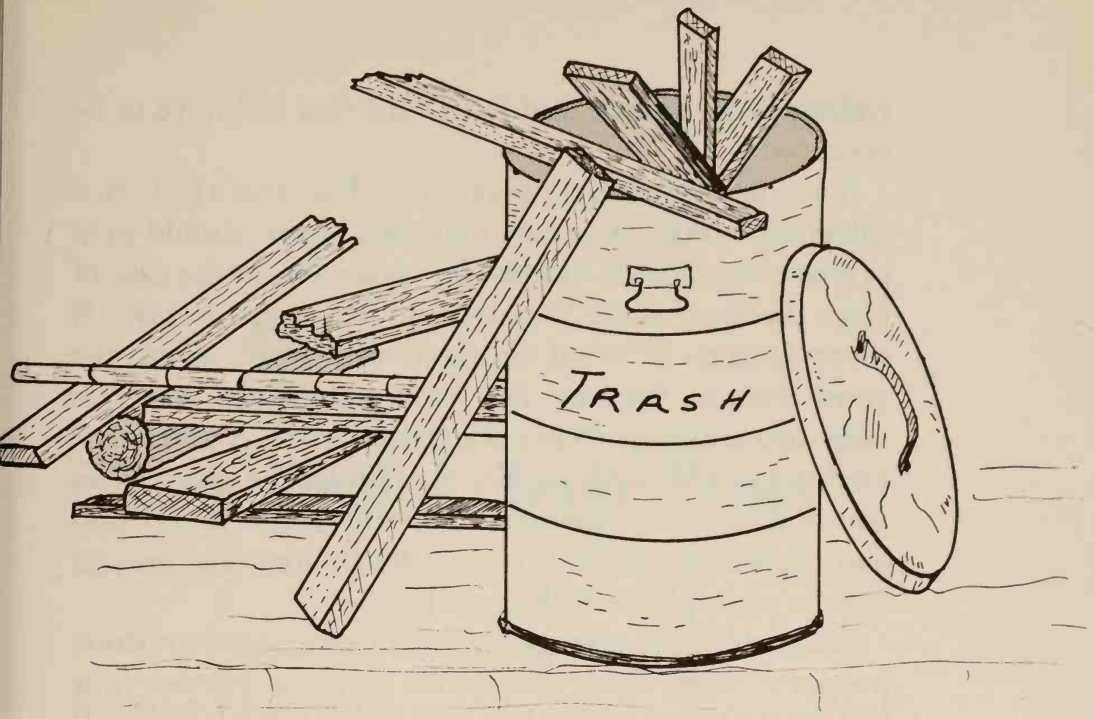
Warped board

The best way to make sure you don't receive warped lumber is to go out with the lumberyard salesperson and inspect the lumber you're going to buy. Lift the edge up to your eye and sight along the surface as you would down the barrel of a rifle. If you have trouble spotting warped wood, ask the salesperson to do it for you.

FINDING SCRAP WOOD

Scrap wood is simply wood that someone no longer wants and throws away. This kind of wood is usually in fair condition. And, if your cash is low and you have some time and a little patience to properly prepare the cast-off wood for reuse, it's an excellent source of lumber. One good source of scrap lumber is someone who often builds things. Perhaps you have a relative or friend who works with lumber. Ask if that person has any scraps you could have.

Or someone in your neighborhood may be building a new home or adding an addition to an existing house. You may be able to get the cast-off lumber you need simply by speaking up. Even lumberyards have scraps and ends which they'll sell for a reduced rate or perhaps even give away. In the city, apartment building superintendents may give you some scrap wood to use. In rural areas, many communities have old houses or barns which are being torn down to make way for new construction. After getting permission from the owner (and often with their blessings), you can cart away as much



lumber as you can use—all free. Ask someone to drive you out to the site. It's amazing how much wood can be squeezed into the trunk of a car or the back of a station-wagon or pickup truck.

Other possibilities include the town dump, or the front curb before garbage pickup day. You may find plenty of wooden crates that once held merchandise and are now little more than a nuisance. The owner of the business will likely be glad to find someone willing to cart away the crates for no charge.

One of the big problems with collecting cast-off lumber is that it may not necessarily be the size you want for your own building project. Also, it may have prot-

ruding nails, screws, and hardware that will have to be removed.

Some nail-removing pliers, a crowbar, and a little rust solvent for removing rusty nails and screws should help prepare the cast-off lumber for reuse. Or, in the case of large pieces of wood, you may do better just to saw off those sections of wood cluttered with nails, saving the good sections for use. For extra-tough jobs you may need two crowbars to pry the pieces apart. A good claw hammer can be used to pull out nails, but be careful that you don't ruin the hammer on really tough jobs. Good hammers are expensive. It's not worth breaking one just to save a couple of dollars on lumber.

Also, when you go scavenging for scrap lumber, dress properly. Wear thick workman's gloves to protect your hands. A long-sleeved shirt and jeans will help protect arms and legs from scratches. And wear heavy-duty shoes or boots and watch for protruding nails. Puncturing your skin with a rusty nail or other sharp object could result in a serious infection.

Carting cast-off wood from where you find it to where you want it is easier on wheels. So, if you have a wheelbarrow, sturdy wagon, or cart, take it along and pile the lumber on it.

Just remember to ask permission to take any cast-off wood you find, unless it's in the garbage can or obviously has been discarded. Don't just assume that lumber you find outside someone's home is unwanted. The owner may be storing it until he has a chance to use it. Asking is the only sure way to find out.

3

Some Useful Hand Tools

NO ONE KNOWS for sure when the first hand tool was invented or how it was used. Probably, some enterprising caveman picked up a thick rock and used it to beat against a tree to scrape the bark away. Or perhaps a jagged rock was used in a back-and-forth motion to saw a young sapling.

Hand tools still serve the same purpose—to alter the shape or size or position of an object.

By far, the most commonly used hand tools are a hammer and saw. But there are hundreds of additional tools, each one designed to perform a specific task. The wise carpenter knows that using the right tool for the right job makes working with wood easier and faster. And taking proper care of hand tools keeps them functioning longer. Anyone who has ever tried to cut

through a piece of tough white oak with a dull handsaw knows that!

Keep your hand tools clean, and return them after use to their proper storage place. Tools left lying around can be broken, accidentally discarded, or dangerous.

The quickest way to ruin most hand tools is to allow them to get rusted. Never leave metal tools outdoors. And, always wipe your tools with an oily rag before putting them away after use. The oil (whether auto motor oil, cooking oil, or whatever) will help prevent rust from forming.

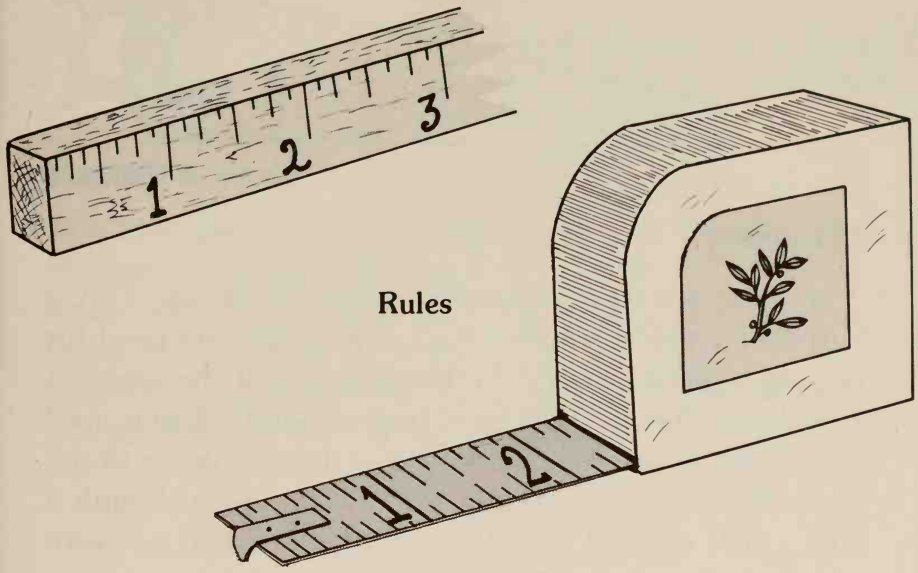
If you're buying your own tools, try to buy the best quality tools you can possibly afford. They'll last longer and work better than cheaper tools.

If you're borrowing tools, be sure to return them in just as good condition as you received them.

Following is a list of frequently used hand tools. This is only a small list, of course, compared to the number of tools that actually exist. But you'll find that, with these, you can perform most of the carpentry tasks you undertake.

Rules

It's important to have a good rule so that you can accurately measure the wood you'll be cutting for your projects. Carpenters generally use two types of rules—the folding rule, which usually measures to six feet in length, and the metal rule, which looks like a metallic

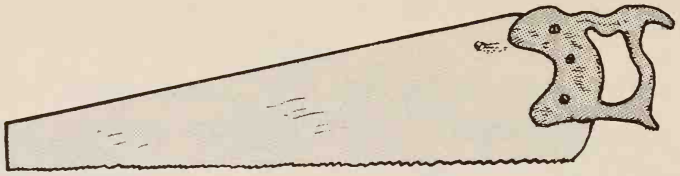


Rules

yardstick, generally measuring 36 inches or less in length. When using a folding rule, be sure to close it up after taking your measurements. If you leave it unfolded and laying around the floor, you're likely to step on it and break it—and that means money! For small jobs, you may be able to use a common 12-inch wooden ruler.

Pencil

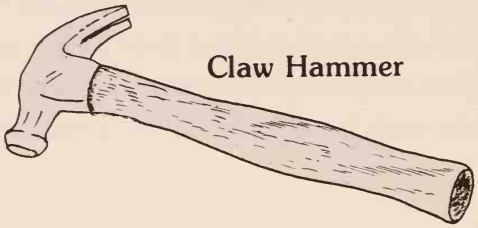
Use a carpenter's pencil or a soft-lead pencil to label the pieces you cut (on the back side), as well as to mark where the lumber is to be cut. Keep the point sharp for best results.



Crosscut Handsaw

Handsaw

There are two types of handsaws in common use. One is a *ripsaw*, with teeth that are set at an angle. It's used for cutting a piece of wood in the direction of the grain. A *crosscut saw* has straight teeth (called points) and is used for cutting across the grain without damaging the wood. A crosscut saw can also be used for ripping, although it cuts a little more slowly. In general, a crosscut saw with eight to ten teeth per inch will work best for most of the projects you'll be making.



Claw Hammer

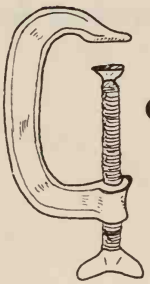
Hammer

This tool is probably the single most important one you will use. Hammers come in a wide range of styles and sizes. Get a *claw hammer*, one with a forked, curved end opposite the head, for pulling out nails. Probably one not too much heavier than ten ounces will be easiest to handle.

Try Square

Square

This L-shaped metal tool is manufactured with a perfect 90-degree (right) angle and is used to check corners to make sure they're square before joining two pieces of wood, like a picture frame, which requires four perfect corners. Squares come in many sizes. The best for you will probably be a small square, called a *try square*.



Common C-Clamp

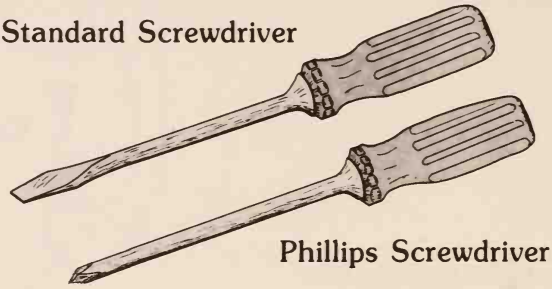
C-clamp or Vise

A C-clamp is used for holding. You may need to hold two pieces of wood together while you join them with nails, screws, or glue, or hold a piece of wood to a table or bench while you're cutting or otherwise working with it. Two C-clamps, about four inches long, will come in very handy. In place of such clamps, a vise attached to a workbench will also work well.

Carpenter's Brace, bit attached

Hand Drill or Carpenter's Brace

This tool, which operates on the same principle as an eggbeater, is used to drill holes in wood. Usually, you want a starter hole to join the wood with screws. Drilling a hole into the wood before screwing will prevent the wood from splitting. Most drills come with a wide range of *bits*—the metal points that actually produce the holes. Although made of metal, these bits can bend and even break, especially when the bit is sunk into a solid piece of wood and pressure is applied sideways to the drill. Always try to apply straight-in and straight-out pressure to the drill so as to save wear and tear on the bits.



Screwdriver

This tool comes in many sizes and with a great number of different size tips and two shapes—flat and cross. They may have wood, plastic, or rubber handles. The *standard screwdriver* has a flat tip for driving single-slotted screws. In some cases, the tip if magnetized to help hold steel screws in place while you work. The *Phillips screwdriver* has a cross-shaped tip for driving cross-slotted Phillips screws.

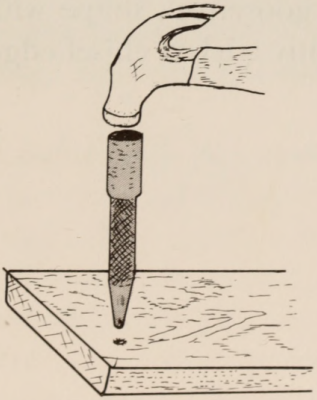
Whichever type of screwdriver is used, it's important to match the tool to the screw. If the blade is too thick, it won't fit into the slot of the screw. If the blade is too wide, it will scratch the wood as the screw head touches the surface. If the blade is too narrow, it can twist around in the screw slot and eventually pop loose from the screw, possibly gouging the wood or injuring the user.

Awl

This tool, which looks like an ice pick, is used in place of a drill to pierce a small hole in the wood in order to start driving a nail or screw.

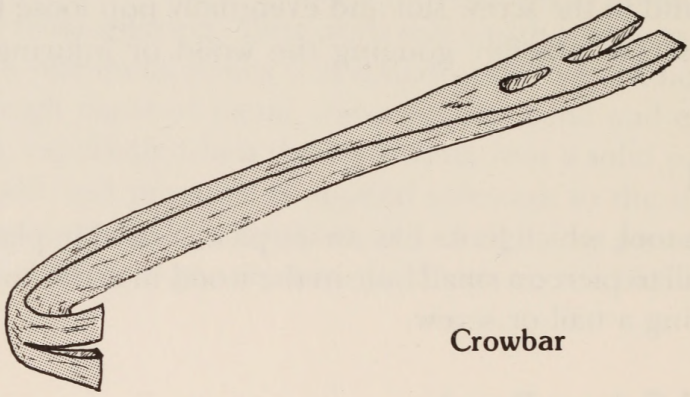
Nail Set, or Punch

This is a tapered tool used to drive nails below the surface of the wood. The heads are then filled in and the



Nailset or Punch

nails hidden. The nail set is most often used with the headless nails, called finishing nails, on wood that will be stained and varnished rather than painted.



Crowbar

Crowbar or Ripping Bar

This is a heavy metal tool used for prying, pulling nails, and tearing things apart. The most commonly used crowbar has a gooseneck shape with a nail slot at one end and a slightly curved chisel edge on the other end.

4

Some Useful Power Tools

PROBABLY THE BIGGEST single boon to carpenters was the invention of the power tool (after the invitation of the first hand tool, that is). Operating on household current—or, in some cases, on battery power—such commonly used power tools as a power drill, saber saw, and power sander make building and finishing things much easier and faster than when working only with hand tools.

Still, working with power tools has its drawbacks. One is that these tools take some handling before the user becomes familiar with their operation. A first- or even second-time power tool user is likely to make some mistakes in judgment that may end up ruining some lumber—possibly even an entire project. Similarly, choosing the wrong size power drill bit or drilling holes

too deeply—two common mistakes—can waste time and money.

For this reason, many skilled woodworkers still prefer hand tools. They feel they have more control over the end results. This is an attitude you should have, too—especially when working on small projects where large, bulky power tools are often more a hindrance than a help.

On large projects, however, power tools can save considerable time. Cutting a 4 × 8-foot sheet of plywood lengthwise with a power circular saw, for example, may take less than a minute with practically no exertion. Making that same cut with a handsaw will possibly take two or three minutes or more and use quite a bit of arm power. Drilling twenty 1/4″ holes with a power drill takes only a couple minutes as opposed to perhaps five to ten minutes with a hand drill. And sanding the top of a large table with a power sander is far quicker and easier than doing the job by hand.

So if you have a large project that could benefit from the use of power tools, here are a few suggestions.

First, *be sure you know how to operate the tools safely.* Have one of your parents or another adult who is thoroughly familiar with the tools show you the right and wrong ways to use them and to stay with you while you use them.

***Always wear protective glasses*—available at most**

hardware stores—and heavy workman's gloves when operating power tools.

Don't wear clothing that hangs too loosely. It might get caught in the electric motor.

Make sure you, the plug, the tool, and the floor where you're standing are all dry. Water, including sweat, is a good conductor of electricity. On damp floors or when working outdoors, wear rubber-soled boots or shoes to help insulate you from shocks.

Before turning a power tool on, examine the tool to see that the cord and plug are in good shape. If the wire is frayed—that is, worn down or split—have the tool repaired at once.

If smoke comes out of the housing of the tool while it is on, stop at once and disconnect the cord. Then take the tool to be checked out by an appliance repair person.

If you drop a power tool or drop something heavy on top of it, have it checked out for possible damage.

Never force a power tool to do more work than it's designed to do. That means: *don't* lean on a drill to make it drill faster; *don't* push on a saw to make it cut faster; *don't* press down on a sander to make it sand faster. You could lose control of the tool and ruin your work or—worse still—ruin the tool itself. If that does happen, you'll have to take the tool in for repair, which is usually costly.

Never cut toward *any part of your body—always* away.

Never drill with your hand, foot, or any other part of

***your body beneath your work*, as the drill bit may break through the underside piece of lumber and puncture your skin.**

***Be thoroughly familiar with the working of a power tool before you plug it in.* And again, only plug it in after checking to make sure the tool, including the cord and the plug, appear to be dry and in good condition.**

Electric Drill

This is probably the most versatile and useful of all power tools. It can easily drill through all types of wood and, using special bits, will drill through metal, glass, and concrete. Many drills also may be fitted with adapters that allow them to drive screws. There are also a wide range of sanding, buffing, and routing (grouping) bits available. In short, an electric drill can be a complete mini-toolchest in itself.

All electric drills have a mother with a handle and an on-off trigger. Some also have a button you can press to maintain a constant speed even when you take your finger off the trigger.

While some drills run at only one speed, a variable-speed drill is more useful. The harder you squeeze the trigger, the faster the drill turns the bit.

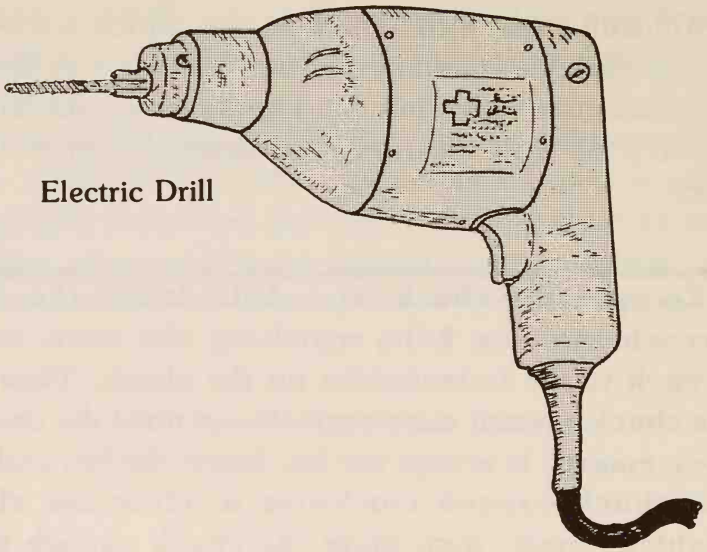
All drills come with a *chuck wrench*, which is a keylike device that opens and closes the part of the drill called the *chuck* into which bits fit. The most popular electric drill is a 1/4″ drill, meaning it will accept bits up to 1/4″ in size.

To open the chuck on a drill: Insert the chuck wrench into the hole, matching the teeth on the wrench to the indentations on the chuck. Then turn the chuck wrench counterclockwise until the chuck is open enough to accept the bit. Insert the bit, and turn the chuck wrench clockwise to close the chuck. Tighten firmly, then move the chuck wrench to the opposite hole and tighten again.

As a safety precaution, unplug the drill whenever opening or closing the chuck. This will prevent the drill from accidentally being activated if you should press against the trigger.

Always work in a well-lighted area so you can see exactly what you're drilling.

Make sure you have a thick piece of scrap wood beneath the drilling area so that, should the bit pop through the other side of the wood you're drilling, no damage will be done to furniture, floor, or carpeting. To catch the wood particles, a dropcloth or some old newspapers should be spread out beneath the working



Electric Drill

area (inexpensive plastic drop cloths are available at lumberyards and hardware stores).

To start a hole, especially on hardwood, push the tip of a nail into the wood, making a small indentation. This will prevent the drill bit from wandering across the wood as you begin drilling.

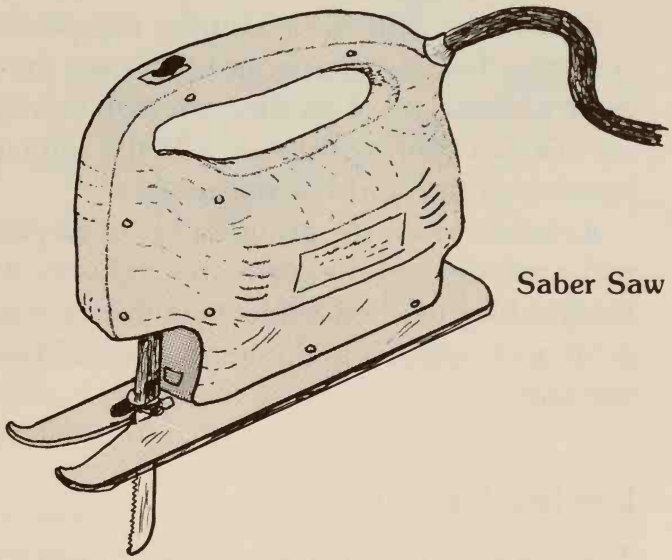
Remember to let the drill do the drilling—don't apply excessive pressure.

Keep the drill running as you finish the hole and gently pull the bit free. Otherwise the bit may bind—stick in the hole—and you could bend or even break it off trying to get it out.

Buy good quality bits. Cheap bits dull fast and have a way of breaking easily. Bits can be purchased in kits containing frequently used sizes from 1/16″ to 1/4″.

If you plan on using a lot of screws in your building

project, you should probably buy a screwdriver attachment for your drill. This is basically a bit with a screwdriver blade on one end. Some attachments have movable metal collars that hold the screwdriver bit in the screw slot. More expensive driver attachments have a large metal cylinder with reducing gears that reduce the speed of the drill so you can drive the screw into wood more easily.



Saber Saw

Saber Saw

This useful power tool features a single short, thin blade that moves up and down at a very fast rate. Saber saw blades are designed to cut various materials from softwood to hardwood, to delicate veneer and even metal and plastic sheeting. The big advantage to using a saber saw is that it can cut circles, inside edges, and even

fancy scallop edges quite easily. (Scallop edges are shaped like the curved edges of a scallop seashell. The saber saw is not well-suited, however, for making long, straight cuts. And it's very noisy and messy, throwing sawdust up, forward, and back.

A metal plate rides along the piece to be cut. To prevent it from scratching, cover the plate with black plastic electrician's tape.

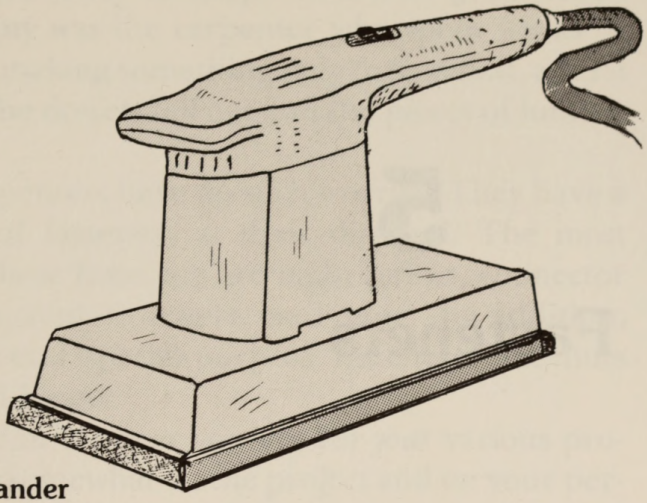
As with the drill, always *unplug* this power tool before changing blades. Changing blades on the saber saw is done with the aid of an allen wrench, furnished with the saw. Do not confuse this saw with the similar jigsaw. The jigsaw is larger and not portable.

A *circular saw* is the granddaddy of all power saws, the real workhorse of the carpentry industry. It has a circular, disklike, toothed blade. Circular saws are very powerful and potentially dangerous tools. You should not use one.

Electric Sander

There are several different types of electric sanders in common use. One, called the *reciprocating-orbital* sander, has a flat sanding base which moves forward and backward in short, rapid strokes. It has an orbital control, for faster sanding of large surfaces. Orbital control means that the base moves in all directions.

The *disk sander* features a revolving sanding disk up to 7″ across. While this type of sander may be used for



Electric Sander

working with wood, it's most often used for sanding, grinding, and polishing metal.

(There is also a *belt sander*, which is too dangerous for beginners to use.)

These four power tools are the most frequently used in carpentry. They are not, however, the only power tools available. Other tools, such as a table saw, router, rotary grinder, and drill press, all serve various specialized purposes in working with wood. But you're not likely to have much need for them.

5

Fasteners

EARLY CARPENTERS AND WOODWORKERS never worried much about how they would join two pieces of lumber. That's because they had few choices beyond nails.

In building large structures, like a log cabin or a barn, they would groove the ends of the logs they were working with so that one log would rest snuggly against another.

On smaller wood projects—like baby cradles, dressers, chairs and so forth—wood was often joined together with wooden dowels, or pegs. A small hole was made through both pieces of wood to be joined, and then the small wooden peg slipped snuggly into the

hole. But, making the dowels took time. And worse, wood has a tendency to warp, shrink, or grow brittle with age. Many was the carpenter who spent weeks or even months making something only to find that, after a short while, the dowels fell out and the pieces of lumber separated.

Today, carpenters have no such worries. They have a wide range of fasteners at their disposal. The most common of these fasteners are nails, screws, connector plates, corrugated fasteners, and glue. In addition, there are several special-purpose fasteners, like nuts and bolts and hinges.

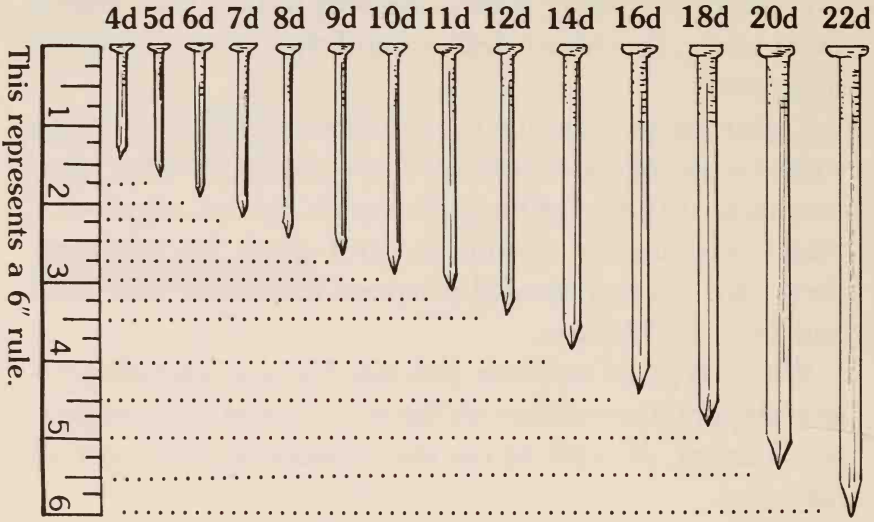
Which type of fastener you use for *your* various projects depends somewhat on the project and on your personal tastes, as well as on the availability and cost of fasteners.

Nails

By far the most common form of fastener, nails come in a wide range of sizes and types, each suited to perform a different task. In general, the two types of nails you will use in your construction projects are common nails and finish nails.

Common nails have large, round, flat heads and are used in work where the heads of the nails needn't be hidden for the sake of appearance. Common nails are available in many different sizes. Most are graded in size by the *penny system*, abbreviated by the letter, "d". Here is

a typical penny sizing chart (with nail lengths given in inches).



A two-penny (2d) nail is 1″ long. Add ¼″ for each next penny length.

Common nails come in all the sizes listed above except 5d, 7d, and 9d.

Finish nails, or finishing nails, are thin nails with small heads that can be countersunk or driven with a nail set to below the surface of the wood. The hole above the nail can be filled and when the surface is finished, the nail holes are hidden. Finish nails, as the name implies, are used primarily in fine finishing work in construction (for instance, on baseboard and window moldings in a

home), as well as in furniture and cabinet construction.

In addition to the common and finish nails, there are many other types of nails: *cut nails* for nailing down flooring; *screw nails* for extra gripping power; *shingle nails* for use in roofing; and even *concrete nails* for nailing into concrete. It's unlikely, however, that you'll need anything beyond common or finish nails in the projects you'll be undertaking in the near future.

To drive a nail into a piece of wood, hold the nail by the shank (the body) well below the head. Place the tip of the nail in the location you want the nail to be driven. Holding the hammer firmly, line up the head of the hammer with the head of the nail. Give the nail two or three light taps so that it is driven just far enough into the wood so as not to fall out when you release your grip on the shank.

Swing your arm at the elbow, hit the nail squarely, and keep on hitting it until the head is flush with the surface of the wood. Don't drive the nail any further into the wood, or the head of the hammer will mar the surface of the lumber.

If you hit the nail at an angle, you'll bend it. Even the most experienced carpenters bend nails from time to time. That's why the forked end of the hammer is so useful.

When you bend a nail accidentally, hold the hammer upside down and slide the notch of the fork under the head of the nail. Then place a piece of cardboard

under the hammer's head to protect the surface when the head of the hammer moves back. Now, apply pressure to the handle until the claws lift the nail out of the wood.

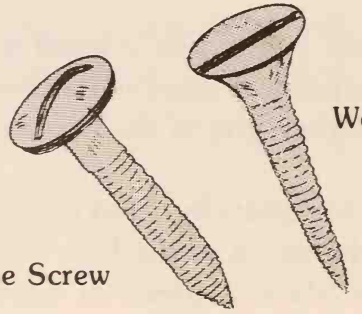
If the nail is too long to allow you to apply leverage on it with the claws, place a wooden block under the hammer's head to raise the hammer high enough so the claws will grasp the nail head. The nail should then come out easily.

Screws

Like nails, screws come in a wide range of sizes and types. And, while they require more effort than nails do, screws have two major advantages. They hold more securely and they can be removed more easily than nails.

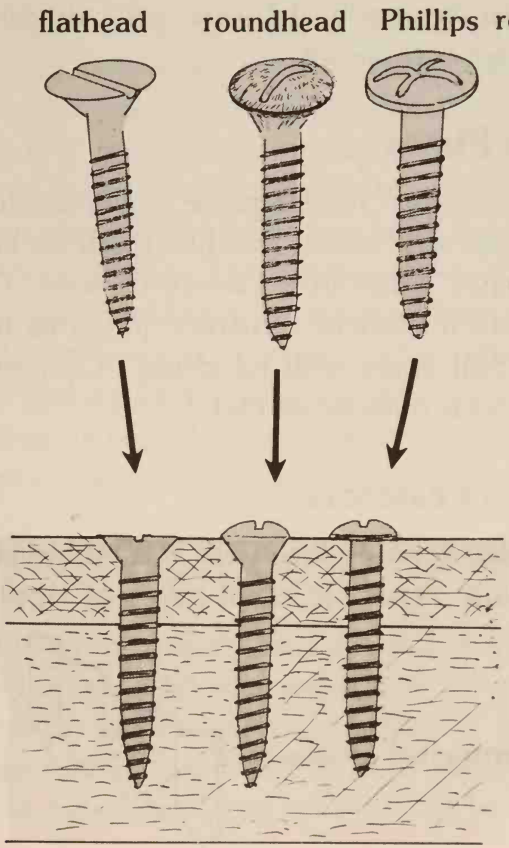
Two major classifications are *wood screws,* which have a pointed end, and *machine* or *tapping* screws, which have a blunt end.

Screws come in a variety of sizes, ranging from



thinnest—called 0-gauge (about 3/8″ in diameter)—to thickest—called 24-gauge. Screws vary in length as well as diameter. For example, a 6-gauge screw comes in lengths from 3/8″ to 1½″, while an 8-gauge screw ranges from 3/8″ to 2″.

As a general rule-of-thumb, you should use a screw that is roughly as long as the board you're joining. Wood screws also vary in the type of heads they have. They may be either flathead, roundhead, or oval. As a



WOOD SCREWS

rule, you'll probably use flathead screws most often, as they can be screwed half-countersunk into the wood or so that the head of the screw is flush with the top of the wood. Or they can be completely countersunk and filled over. Both roundhead and oval screws leave their heads sticking above the surface of the wood, which may not look very good on a finely finished project, unless, of course, the screws are in a place where they can't easily be seen.

Wood screws are usually made of steel or brass, but they may also be made of bronze and aluminum, or a mixture of several metals.

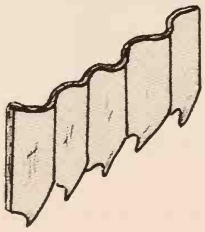
Connector Plates

These fasteners are small square or rectangular pieces of steel with several short, nail-like teeth sticking out of one side. They come in a variety of sizes. Connector plates are often used to reinforce joints to make sure they don't pull apart with handling. They are usually used along with nails or screws.

Corrugated Fasteners

These peculiar-looking fasteners, sometimes referred to as wiggle nails, resemble small strips of rippled metal.

Corrugated Fastener



They're used to join adjacent pieces of wood by holding the fasteners on end like a nail and driving them with a hammer until the top is flush with the top of the wood.

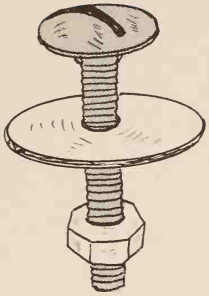
Glue

Long the carpenter's friend, various types of glue have been used over the years to join wood to wood, wood to metal, plastic to wood, felt to wood, and so forth. Of all the glues on the market, perhaps the most commonly used for gluing wood to wood is a polyvinyl-resin glue, or white glue. It's milky-white looking when wet, but dries clear. It's easily washed off hands and tools with water. Thus it is not recommended for outdoor projects. But it forms a tight, nearly invisible bond, especially when the glued pieces are held together with a C-clamp while drying. This gives the glue time to penetrate the wood, making separation all but impossible.

For outdoor work, a resorcinol glue, consisting of a red liquid and a powder which must be mixed to make the adhesive, is best. It is extremely resistant to water, but it leaves a dark red stain, so use it carefully.

Bolts

Nuts and bolts are often used when a strong union is desired between wood and wood and other materials. Bolts resemble screws, except that they're straight, unlike the tapered shaft of a screw. They come in a variety of sizes and styles, and nuts are available to fit them all.



Bolt with Washer

To connect two pieces of wood with a bolt, you must first drill a hole slightly larger than the size of the bolt's shank or body through both pieces of wood. Place a washer—something resembling a flat metal doughnut—over one hole and slip the bolt through the washer and hole. The bolt should be roughly 1/2″ longer than the thickness of the two pieces of wood being joined so that the end of the bolt sticks out the back of the wood. Place another washer around the end of the bolt and then thread a nut onto the bolt. As the nut screws snuggly up against the washer, you'll need a wrench or a pair of pliers to hold the nut tight while you use a screwdriver to turn the slotted head of the bolt from the opposite end. The washers keep the bolt head and nut from digging into the wood as the bolt is tightened.

Stove bolts, the type of bolts most often used in woodworking, range in size from 3/8″ to 6″ in length and from 1/8″ to 1/2″ in diameter.

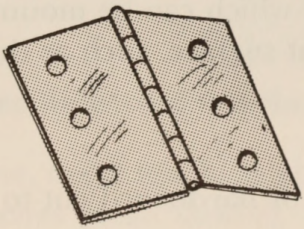
Hinges

Hinges, like those holding your home's front door to the door jamb, come in a wide range of styles and sizes. They have two leaves, which may be plain and functional or very decorative and fancy. They are used to join two pieces of wood where one of the pieces is meant to be opened, as a door or a top of a box.

The easiest types of hinges to install are *surface hinges*. These are small hinges that are screwed directly onto

the surfaces of two adjoining pieces of wood. An example of small surface hinges are *butt hinges*. Small butt hinges generally have a fixed pin in the knuckles. Knuckles are barrel-like loops on the hinge leaves. Larger butt hinges often have a loose pin in the knuckles. Common door hinges are of this type. Most often, you will probably use small butt hinges for your hinged projects.

No matter what type of fasteners you choose for your construction projects, you can probably find what you want at a well-stocked lumberyard or hardware store. If you're not sure what type of fastener would work best for a particular project, explain the project to the salesperson and ask for a recommendation. That may be the surest way of getting just the right size nail or screw, bolt or other type of fastener needed to complete your project.



Butt Hinge

6
Some Easy Projects

BASKETBALL BACKBOARD

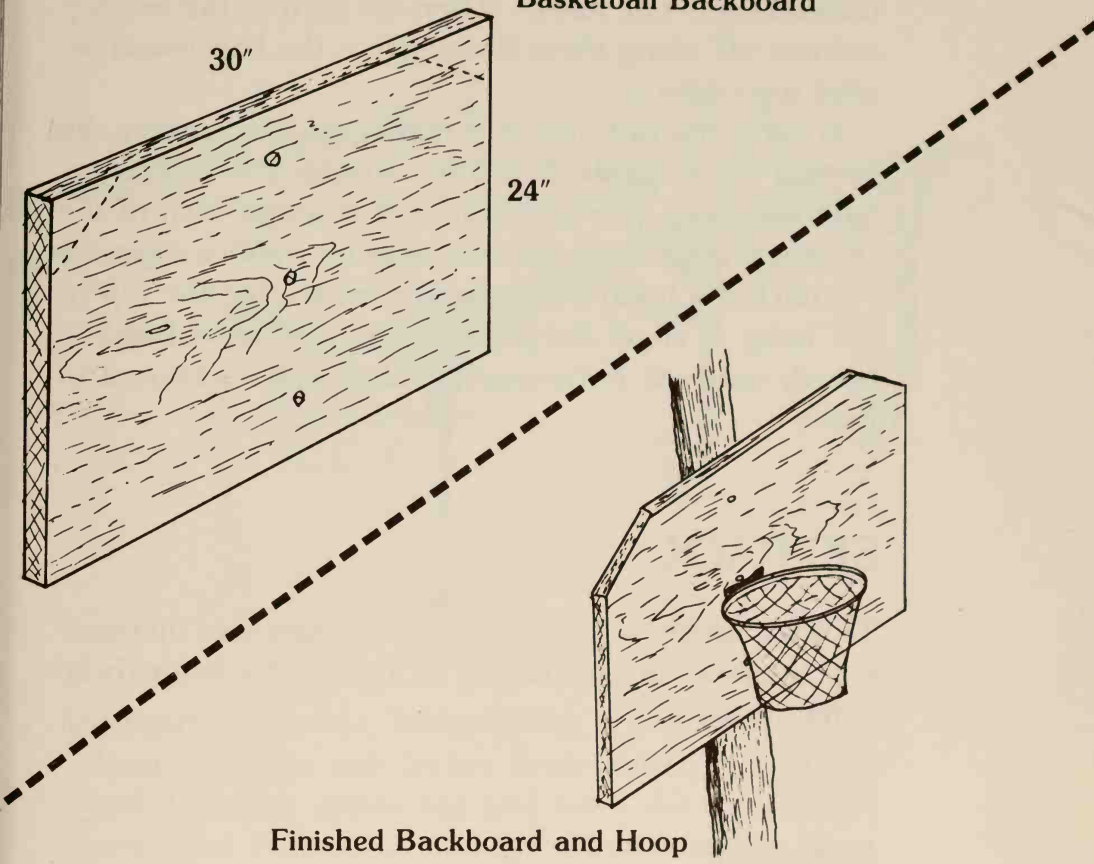
This is an inexpensive and simple way to make a basketball backboard which can be mounted on a metal pole, tree, or any flat surface, such as the side of a building.

Materials:

5/8″ sheet of hardboard cut to 24″ × 30″

Procedure:

Place a mark at the 15-inch or center spot along each of the 30″ sides of the hardboard. Using a ruler or some other straightedge, draw a line across connecting the two marks.



Finished Backboard and Hoop

Next, along the line, make marks at points six inches from the top, 12 inches (dead center), and six inches from the bottom.

Now, starting with the left top corner, measure and mark four inches along the long side of the board and four inches along the short side. Then go to the right top corner and repeat the process. Draw a line connecting the two left-side marks and a second line connecting

the two right-side marks. Then cut each of the two top corners off along these lines, giving the backboard *beveled* top edges.

Finally, drill out the three marks you made along the vertical center of the board for attaching to a post—or hammer large, 10d common nails through each of the three marks to attach to a tree or other wooden support.

Attach the hoop to the backboard so that the top of the hoop is about six inches from the bottom of the board, centered horizontally. Paint your backboard to finish it.

SKI RACK

This is a handy way to store skis. It's easy and inexpensive to make for yourself or as a gift. This is for three pairs of skis.

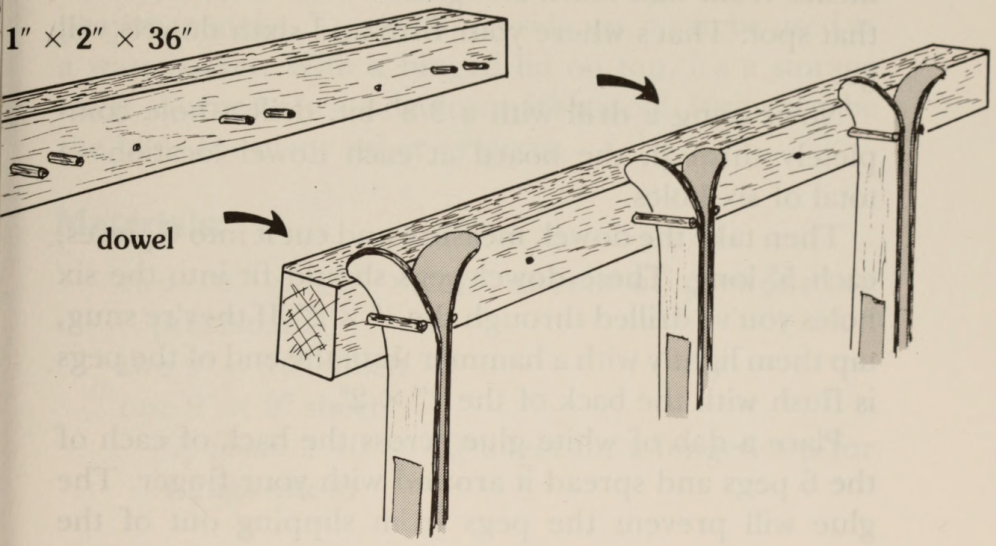
Materials:

one 1″ × 2″ × 36″ board
one 3/8″ × 36″ wooden dowel
white glue

Procedure:

Starting with a 36″ × 1″ × 2″ board, measure and mark 3/4″ in from both ends. Connect the two points with a

Ski Rack



line down the center, using a ruler or yardstick.

Next, measure two inches from either end of the board down the center line and mark the spot. That's where your first dowel will go. Then measure three inches from that mark down the center line and place another mark where the second dowel will go.

Place a mark at the 18-inch spot along the center line. This is the very center of the board. Measure 1½ inches to the left of the center mark along the center line and mark that spot. Then measure 1½ inches to the right of the center mark and mark that spot. That's where your third and fourth dowels will go.

Finally, measure two inches from the opposite end of the board and mark the spot. Then measure three inches from that mark along the center line and mark that spot. That's where your fifth and sixth dowels will go.

Now, using a drill with a 3/8″ bit, drill a hole completely through the board at each dowel location—a total of six holes.

Then take the dowel, measure and cut it into 6 pieces, each 5″ long. These dowel pegs should fit into the six holes you've drilled through the 1″ × 2″. If they're snug, tap them lightly with a hammer until the end of the pegs is flush with the back of the 1″ × 2″.

Place a dab of white glue across the back of each of the 6 pegs and spread it around with your finger. The glue will prevent the pegs from slipping out of the holes. (If the pegs fit tightly, you may not need to use glue.)

Finally, drill two 1/4″ holes along the center line, each nine inches from opposite ends of the 1″ × 2″. Use 14-gauge flathead screws (2¾″ long) to fasten the ski rack to the wall or the back of a door through the 1/4″ drilled holes.

Place the ski rack high enough so that when the skis are inserted between each set of dowels, the ends of the skis aren't touching the floor. One ski pole can be hung on each of the six dowels, also. See Chapter 7, "Finishing the Job" and choose a method of finishing your ski rack with paint or varnish.

CUBE

This small cube measuring ten inches square is an easy project to make. Turned open-side up, it can be used as a wastebasket. With a hinged lid on top, it's a storage chest. Turned open-side down, it's a stool. It can also be the basis for many other projects.

Materials:

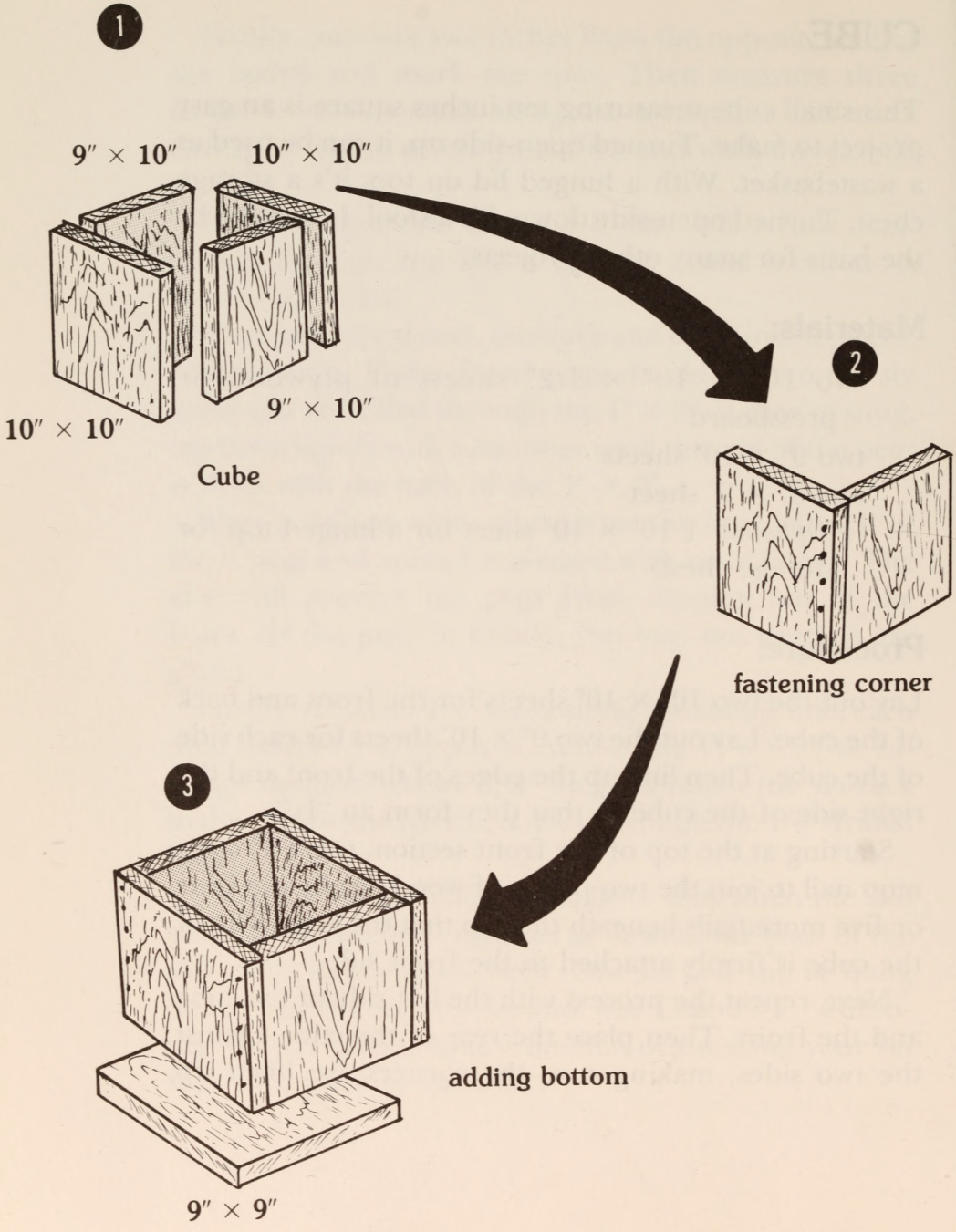
two 10″ × 10″ × 1/2″ sheets of plywood or pressboard
two 9″ × 10″ sheets
one 9″ × 9″ sheet
(*Optional:* 1 10″ × 10″ sheet for a hinged top for storage chest)

Procedure:

Lay out the two 10″ × 10″ sheets for the front and back of the cube. Lay out the two 9″ × 10″ sheets for each side of the cube. Then line up the edges of the front and the right side of the cube so that they form an "L."

Starting at the top of the front section, use a 1″ common nail to join the two pieces of wood. Space out four or five more nails beneath that, so that the right side of the cube is firmly attached to the front side.

Next, repeat the process with the left side of the cube and the front. Then place the rear of the cube against the two sides, making sure the corners are lined up


1
9″ × 10″
10″ × 10″
10″ × 10″
9″ × 10″
Cube
2
fastening corner
3
adding bottom
9″ × 9″

flush, and secure the rear of the cube with five or six nails. Repeat the process on the remaining edge.

Finally, lay down the bottom sheet, measuring 9″ × 10″, and set the four-sided cube over it. With some wiggling, the walls of the cube should slide down around the bottom piece. Once this is done, use four or five nails to secure each side of the cube to the bottom. See the chapter on finishes.

STORAGE CHEST

Beginning with the basic cube, including the optional 10″ × 10″ cover, you can make a hinged storage chest.

Additional Materials:

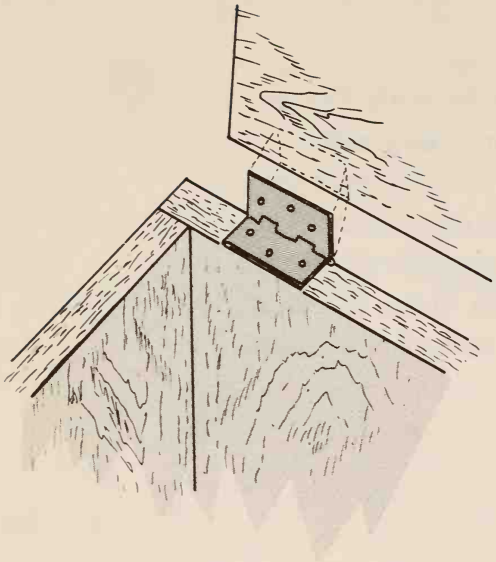
two small butt hinges

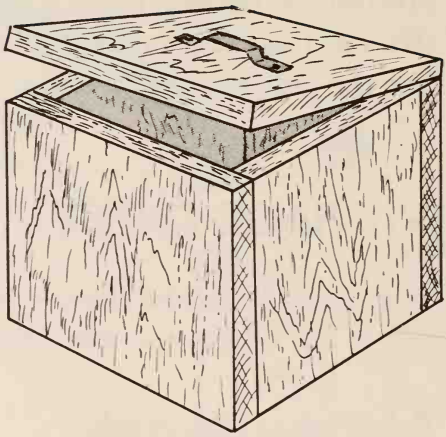
Procedure:

Once all five sides of the cube are secured (see procedure for cube above), place a butt hinge (closed) two inches from the left on the top of the rear panel so the knuckles of the hinge extend beyond the wood.

With an awl or a sharp lead pencil, mark the position of the holes onto the top of the rear section.

Lay the second butt hinge on the rear panel two inches from the right, so the knuckles of the hinge extend beyond the wood. Then mark these holes on the top of the rear section.





Hinged Storage Chest

Next, lay the 10″ × 10″ cover in front of you and set one of the butt hinges along one side of the panel two inches from the corner so that the knuckles of the hinge extend beyond the wood. Mark the holes. Repeat this procedure with the second hinge placed two inches from the opposite corner and mark the holes.

Finally, drill out all holes, both on the top of the rear panel of the cube and on the cube cover. Use a drill bit slightly narrower than the size of the holes in the hinges.

Using screws to fit the holes, attach one leaf of one hinge to the top of the cube and one leaf of the second hinge to the top of the cube opposite it. Then attach

each of the hinges to the cover in the same manner. Close the cover, and you have a hinged-cover storage chest. If you want, you can add a handle as shown in the illustration. Handles are usually bought with the proper size screws already in the package.

BENCH

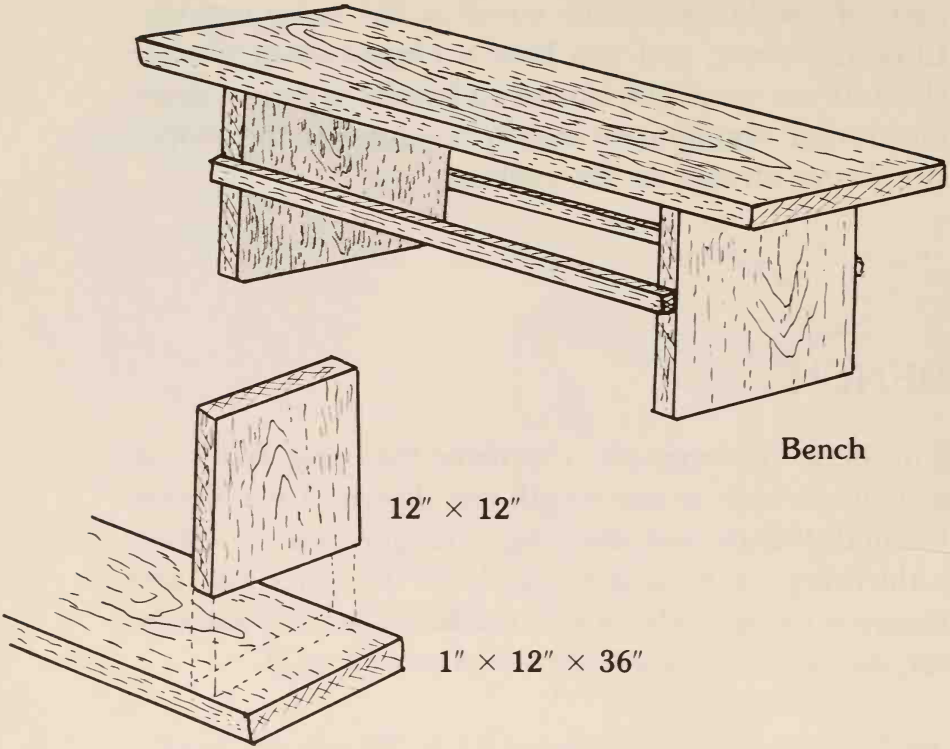
This bench is designed to be three feet long, but it can actually be built to any length you desire. If you decide to build a bench four feet long or longer, you should cut a third leg the same dimensions as the other legs and secure it to the underside of the bench seat, in the center, so the bench won't sag when you sit on it.

Materials:

one 1″ × 12″ board 36″ long for the bench seat
two 1″ × 12″ × 12″ boards for the legs
two 1″ × 2″ board 32″ long for the leg brace
white glue

Procedure:

Starting with the bench seat, 12″ × 36″, measure two inches from each end and mark those spots. Then,



Bench

using a square, extend a line from each mark across the width of the board at each end.

Next, take one of the 12″ × 12″ boards, to be used for the legs, and place a line of glue along any one edge. Do likewise along the inside edge of the line on the bench seat board. Press the leg to the bench seat board, being sure that the leg's center is aligned with the marked line. There should be roughly one-half inch of the leg on each side of the line when using a one-inch-thick leg.

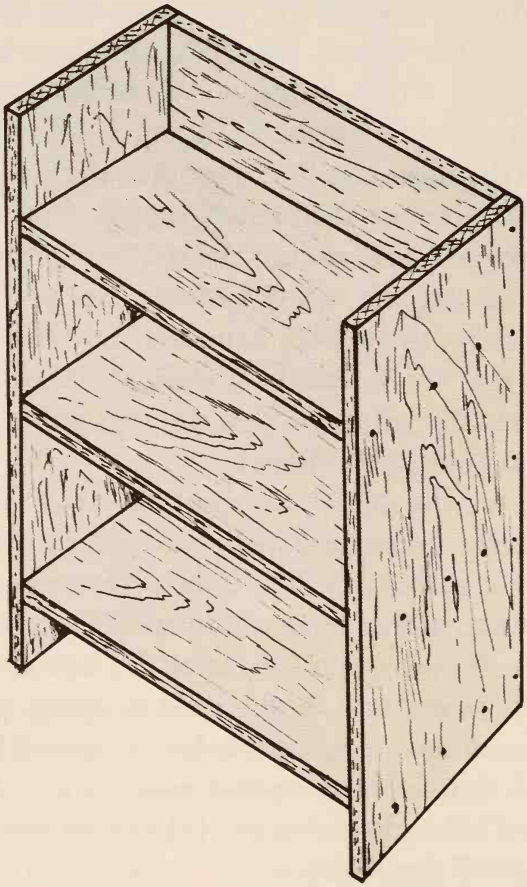
Repeat the process with the second leg on the opposite end of the bench seat. Allow the glue several hours to stiffen.

Once the legs are set and securely glued to the bench seat, turn the bench over so that the bench is resting on its two legs. Just as you did on the underside of the seat, measure two inches from one end and mark that spot. Using a square, extend the line from that mark across the width of the board. And repeat the procedure on the other end. Then, using a 3/8″ drill bit, drill three holes pretty evenly spaced along each line and exactly down into the legs. Use 3/8″ diameter flathead screws to permanently secure the bench seat to the legs, being sure to screw the screws into the seat until the heads are countersunk slightly so you don't rip your clothing when you sit on the bench. Note that now the bench seat side with the screw heads showing is the top of the bench, while the side to which the legs were attached is now the bottom of the bench.

Finally, set the bench upright in front of you and make a mark about four inches down from the top on each of the legs. Lay the 1″ × 2″ brace to connect the legs so that the top of the brace aligns with the mark on each of the legs. Using 4d nails, secure the brace to the legs, two nails on each end. For added support, place some white glue on each end of the brace before laying it in place and hammering in the nails. Turn the bench around and add a brace to the other side the same way. See Chapter 7 for finishes.

BOOKCASE

This project is basically a box with a shelf in the middle. Adding a hinged door to the front turns the case into a cabinet.



Materials:

two 1″ × 12″ boards, each 28″ long, for sides
three 1″ × 12″ boards, each 15″ long, for top, bottom, and shelf
one piece pressboard or hardboard, 1/4″ thick, cut 28″ × 16½″ for back
two 1″ × 1″ molding strips cut 10″ long

Procedure:

Lay the bottom of the case, a 1″ × 12″ cut 15″ long on the floor, and butt one of the 28-inch-long sides up against it, forming an "L." Using finish nails, about 1½ (4d) inches long, secure the side to the bottom. Then repeat the process, nailing the second side to the bottom.

Next, turn this three-sided construction upside down and nail the two sides to a 1″ × 12″ × 15″ that will serve as the top; follow the same procedure as you did when nailing on the bottom. You should now have a four-sided rectangular box open in the front and back. Don't worry if it seems wobbly; you'll take care of that later.

Using a ruler, place a mark on the inside of each of the two 28-inch sides, at the halfway point. That would be at the 14-inch mark on the ruler, when measuring from the *outside top* of the construction. Lining up a try square with each mark, extend a line across the inside of each of the 28-inch sides. These lines are the center lines—the points that should align with the center of the shelf.

Next, using a ruler, place a mark 1⅛ inches below each of the center lines and, with a square, extend a line across the inside of each of the 28-inch sides, so you end up with two lines—the center line and a lower line—on each side.

Lay the case on its side and, taking one of the 1″ × 1″ molding strips, set it in place so that the *bottom* of the molding strip rests on the lower line. Holding the strip so that the back of the piece is flush with the back of the case, use finish nails *no longer than 1¼ inches* (3d) to nail the molding strip to the side from the inside out. Two or three nails should work well.

When that's done, turn the case over on its opposite side and repeat the process with the second molding strip, aligning the bottom of the strip to the lower line and making sure the back of the strip is flush with the back of the case.

Next, turn the case on its face (with the backside up). Take the 28″ × 16½″ piece of pressboard and align it with one side of the case. Nail it in place with 2d common nails. Before nailing the remaining three edges down, check to be sure the case is square. You may have to pull the case slightly one way or the other in order to align its sides with the edges of the pressboard. Once the sides are flush with the edges of the pressboard, finish nailing the back panel on.

When that's finished, turn the case rightside up and slide the remaining 1″ × 12″ × 15″ shelf into place atop the two molding strips. If you want the shelf to be re-

movable, don't nail it in place. Otherwise, you can use several 3d finish nails, nailed from the outside in to secure the shelf—one row of nails on each side of the case.

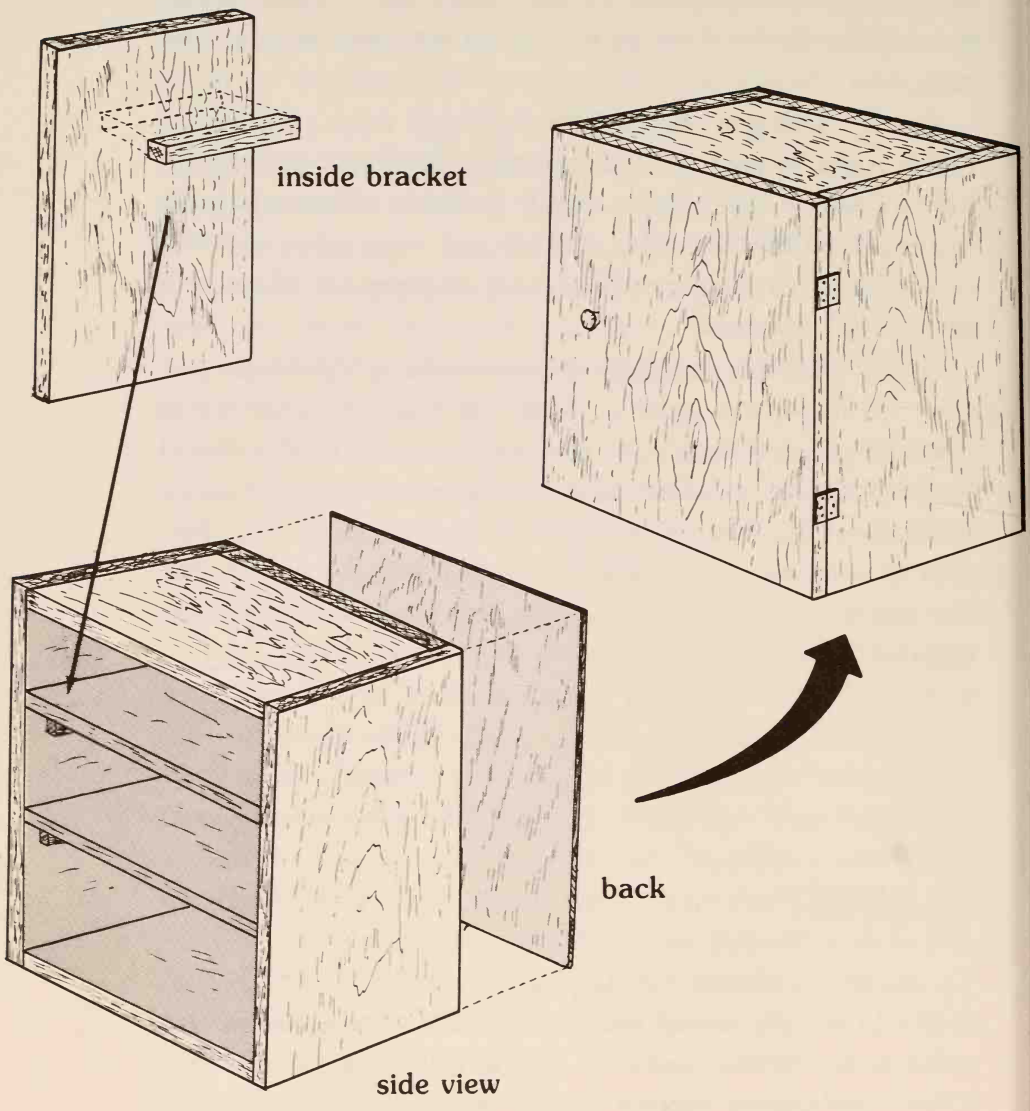
Finally, using a nail set, countersink each one of the finish nails. If you plan on painting the bookcase, fill the holes first by pressing a small amount of wood putty into each hole with your thumb and wipe away any excess with your fingers. Once you've painted, there will be no sign of nails.

If you plan on staining and varnishing the bookcase, *don't* fill the holes until at least one coat of varnish has been applied. Otherwise, the putty will soil the wood and spoil the appearance of the case. Once you've stained, varnished, and puttied, you can use another coat of varnish to seal the putty in the holes and make the wood's finish more durable. See Chapter 7, "Finishing the Job."

CABINET

To make a cabinet measuring 28″ × 16½″ × 12″ (actually 11⅝″, the *actual* width of a 12″ board), follow the procedure for the bookcase above, but cut an additional front door panel measuring 28″ × 16½″. Use a slightly

Cabinet



thicker piece of wood, at least 1/2", to enable you to sink screws (to hold the hinges) into the inside of the wood without popping through the other side of the door.

To complete the job, add two butt hinges (as described in the procedure for making a storage chest) and a knob or handle, if desired.

DESK

Since the average height of most desks is around 29 inches, you can very easily use two bookcases (or two cabinets) as the legs or supports for a desk top. To build the bookcases or cabinets, see the preceding plans.

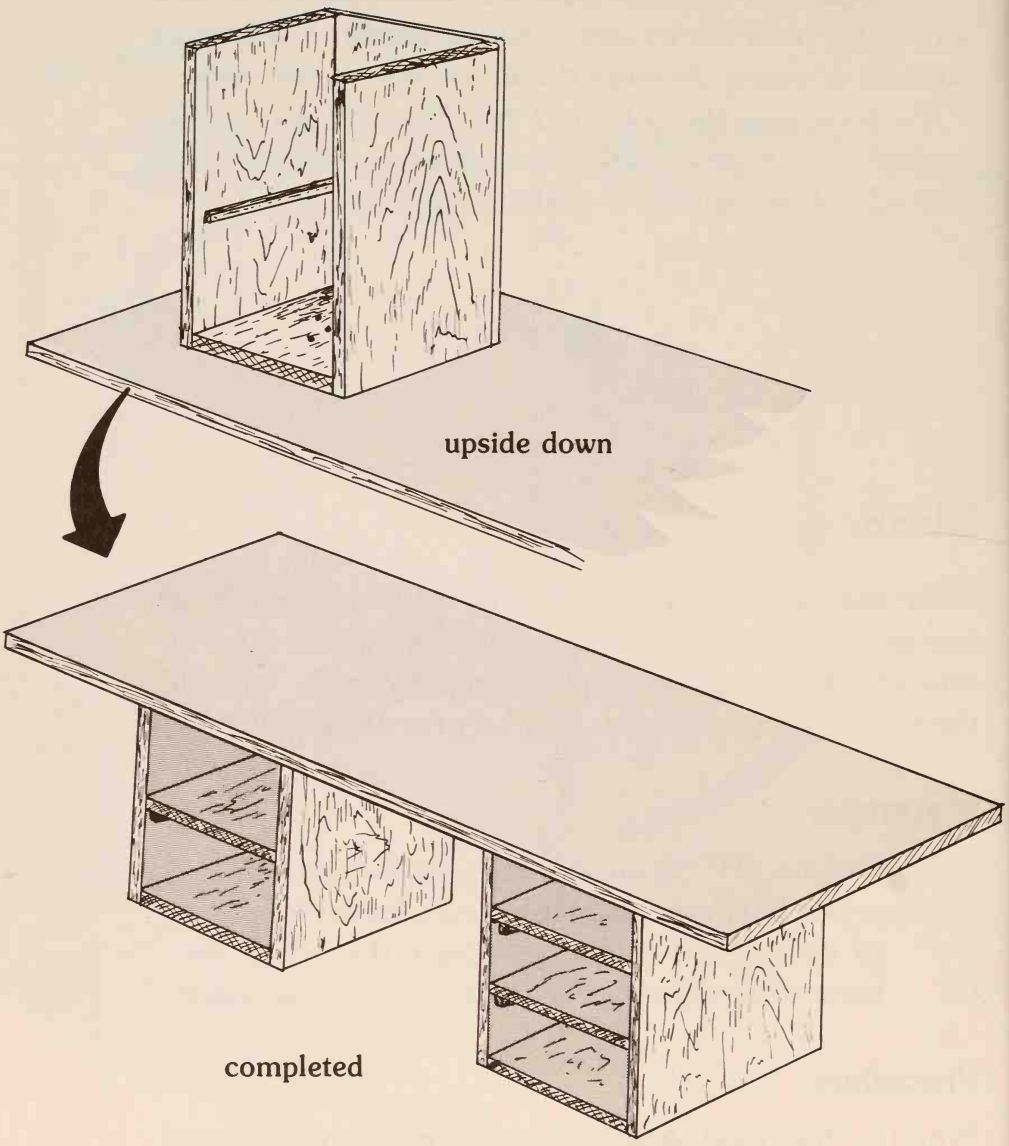
Materials:

one sheet 3/4" plywood, cut to measure 48" × 20"
two previously erected base pieces, either bookcases or cabinets (If cabinets, be sure the doors open toward the outside of the desk for convenience.)

Procedure:

With the desk top laying before you, measure and mark

Desk



off a line four inches from the front of the desk and extending the length of the top.

Next, turn one base section upside down and align the outside of the base with the end of the desk top and the front of the base with the line marked on the top. Mark and drill a hole through the base at approximately the center top of the base and halfway into the desk top. Don't drill all the way through the desk top, or the hole will show once the desk is completed. Then in the same manner, mark and drill two more holes, each one about three inches to either side of the center hole. Using flathead screws *no longer than* 1¼", secure the base to the desk top.

Follow the same procedure to secure the second base to the opposite end of the desk top. Once completed, you can carefully turn the desk rightside up and prepare to finish it in the way you wish, using either paint or stain and varnish. See Chapter 7.

Note: for more usefulness, you can add several shelves to either or both base units of your desk, following the same procedure you used in making the center shelf. Just make sure the additional molding strips are paired up the same distance from the bottom of the unit so the shelves lay flat. By having at least one unit with several shelves in it, you'll have places to keep notebook paper, magazines, a dictionary laid on its side, and even pencils, rulers, and erasers.

TABLE

Making a table is easy when you combine a cube, modified slightly, and a top.

Materials:

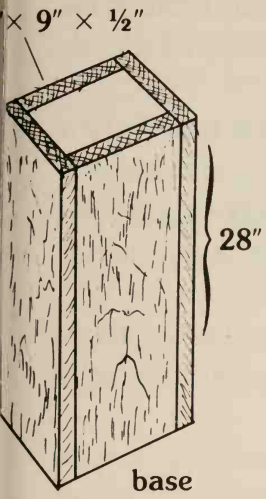
two 28″ × 10″ × 1/2″ sheets of plywood for the front and back of the base
two 28″ × 9″ × 1/2″ sheets for the sides of the base
one 9″ × 9″ × 1/2″ sheet for the base plate
one 24″ × 24″ × 1/2″ sheet (or whatever size you wish) for the tabletop

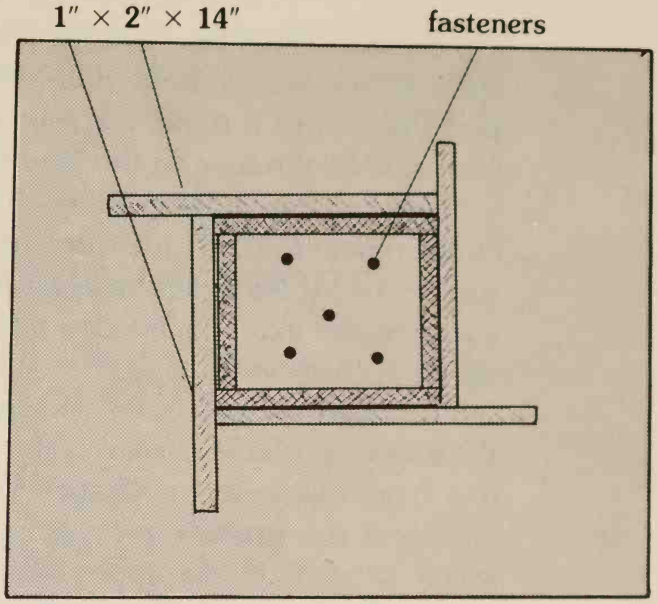
Procedure:

Lay out the two 28″ × 10″ sheets for the front and back of the base. Then lay out the two 28″ × 9″ sheets for each side of the base. Line up the edges of the front and the right side of the base so that they form an "L." Starting at the top of the front section, use a 6d finish nail to join the two pieces of wood. Space out 8 or 10 more nails beneath that, so that the right side of the base is firmly attached to the front.

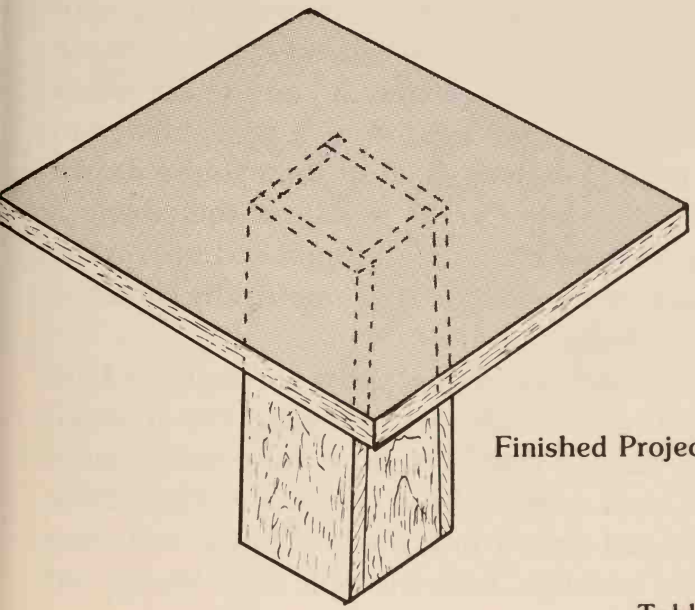
Repeat the process with the left side of the base and the front. Then place the rear of the base against the two sides, making sure the corners are lined up flush, and—beginning at the right—secure the rear of the base with 10 nails. Repeat the process on the remaining edge.

Lay the square sheet (measuring 9″ × 9″) down and





bottom view



Finished Project

Table

slip the four-sided base over it. With some wiggling, the walls of the base should slide down around the base plate. Once this is done, use four or five nails to secure each side of the base to the base plate.

Next, lay the tabletop down and set the base (open end up) next to it. With a rule, measure off and mark a spot seven inches from the lower lefthand corner. Take a square and extend a line from that point seven inches up from the bottom.

Then measure off and mark a spot seven inches from the lower righthand corner. Take a square and extend a line from that point seven inches up.

Repeat the process, measuring and marking a spot seven inches from the upper lefthand corner and using the square to extend a line from that point seven inches down from the top. Finally, measure and mark a spot seven inches from the upper righthand corner and use the square to extend a line from that point seven inches down from the top. Then use a rule or straightedge to connect the ends of each of the four lines you've drawn to form a 10-inch square in the middle of the tabletop.

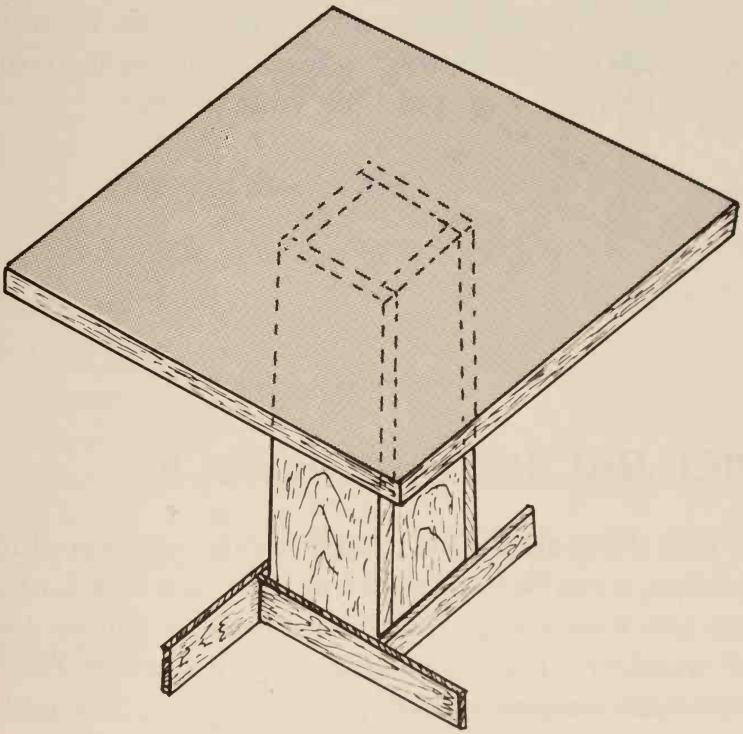
Next, take the base and place it (open end up) on the 10-inch square. Now the base is geometrically centered beneath the tabletop.

With a drill, make a hole 3/4″ deep, through the base plate and halfway through the tabletop at the approximate center. Repeat this procedure four more times, once toward each corner of the base plate. Then drive five 3/4″ flathead screws into the five holes, attaching the base to the tabletop. Turn the table rightside up and

finish it off in any manner you choose. For a professional-looking job, countersink the nails and putty and paint, or stain and varnish, and then putty the nailholes. See Chapter 7.

TABLE WITH ADDED SUPPORT

To make a table with added support so there's less



chance of tipping, you'll need four 1″ × 2″ boards, each 14 inches long, in addition to the table above.

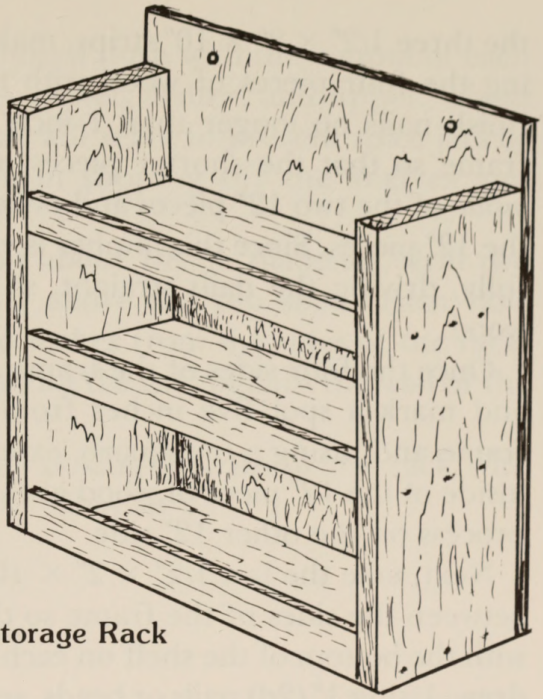
Procedure:

With the table standing upright, place one 1″ × 2″ up against the bottom of the base, with one end of the 1″ × 2″ flush with the edge of the base and the other end sticking out four inches. Use 2d finish nails to secure the board to the base.

Next, nail the second 1″ × 2″ to the next side of the base. Follow with the third and fourth boards. Countersink all nails and follow the instructions above for puttying. See Chapter 7 on finishing your project.

SPICE RACK/STORAGE RACK

The nice thing about this project is that, with very little alteration, it can be a spice rack or a storage rack for just about any little things that have a way of getting lost. The number of shelves and the distance between shelves will determine what you can store in this rack.



Spice or Storage Rack

Materials:

two 1/2″ × 2″ × 12″
three 1/2″ × 2″ × 10″
three 1/2″ × 1″ (approximately × 11″
one sheet 1/4″ plywood or pressboard cut to 11″ × 12″
white glue

Procedure:

Using the two 1/2″ × 2″ × 12″ strips or pieces and two of

the three 1/2″ × 2″ × 10″ strips, make a frame, connecting the four pieces of wood with thin metal brads or finish nails no longer than 1 inch (2d). Assemble the frame so that the shorter pieces of wood are on the *inside* of the two 12″ pieces and nailed from the sides of the 12″ pieces. Since this lumber is very thin, work carefully, driving the nails straight, so you don't split the wood.

Once the four sides of the frame are joined, measure and mark a spot five inches from the bottom of the frame and, using a try square, extend a line across the inside of the 12″ piece of wood at that point. Repeat the process on the other 12″ side.

Next, take the last 1/2″ × 2″ × 10″ strip and insert it between the sides of the frame so that it forms a shelf, with the bottom of the shelf on each of the lines you just drew. Using 1″ (2d) nails or brads, secure the shelf to the frame by nailing from the outside of the frame in.

Place the frame with center shelf face down in front of you and apply white glue along the back edges of all the wood—the outer frame and the center shelf. Then press the 11″ × 12″ sheet of plywood or pressboard backing against the frame. Make sure the edges of the frame are flush with the backing. Place several books or other weights on the backing and allow the glue to "set up" or stiffen for about an hour. Then nail several 1″ (2d)nails through the backing and into the frame and center shelf for added support.

Turn the rack on its back, face up, and nail the three 1/2″ × 1″ × 11″ strips across the face of the frame, with

the bottom of each board flush with the bottom of each of the three shelves—lower, center, and upper. These three 1/2″ × 1″ strips will serve to prevent spice jars or other containers from slipping off the shelves and breaking.

Finally, using a bit about 1/8″ in diameter, drill two holes in the backing above the top shelf. Each hole should be about two inches from the sides of the rack. They'll be used to mount the rack against the wall or the back of a door.

For a professional-looking job, finish the rack with stain and varnish. See Chapter 7.

7

Finishing the Job

ANY PROJECT you make with wood will require some sort of finish. A proper protective finish will prevent the wood from absorbing moisture in the air and warping, and from showing smudges and fingerprints. Finishes also extend the life of the object, and—nine times out of ten—improve its appearance.

Wood is made up of thousands upon thousands of tiny cells through which sap flowed when the tree was living. Once the tree was felled and the trunk sawed into boards, many of these cells were exposed. The size and arrangement of these cells gives wood its distinctive *grain*, or pattern. To emphasize the beauty of grain, you'll want to stain and varnish the wood. Staining changes the color of the wood without hiding the grain. Varnishing seals off the cells to protect the wood.

Paint is a better finish for wood that does *not* have an attractive grain, or which has been damaged, or has large, ugly knots. Paint, like varnish, seals off the cells of wood and protects the wood from both moisture and dirt. And, if done properly, paint can increase the beauty of an object.

But before you paint or stain your project, you must first sand it down.

SANDING

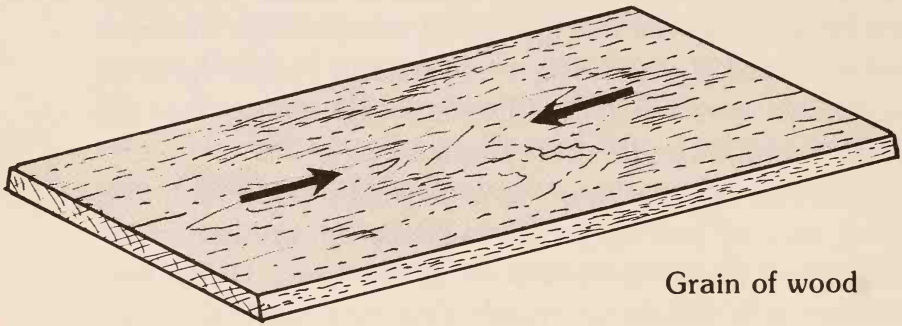
Sanding wood serves two purposes. First, it cleans the surface of the wood so that whatever finish you apply will be absorbed by the wood and serve as a permanent sealer. Secondly, sanding removes the rough spots in wood. No wood finish will hide rough spots. In fact, finishes make rough spots stand out.

On small objects, sanding is normally done by hand, using one of two different substances: sandpaper or steel wool. (Both are available at hardware stores and lumberyards.) Both sandpaper and steel wool come in a variety of grades, from very fine to very course. The finer the grade, the longer it will take to remove rough spots from wood. While coarse grades do the job faster, they also run the risk of scratching the wood. Steel wool tends to darken the surface on which it is used, so think of this when deciding what to use for sanding.

In general, for coarse-grained, very rough lumber

(like plywood, for example), use a coarse grade of sandpaper. For fine-grained, fairly smooth, or soft lumber (like pine or fine-grained mahogany), use a finer grade of sandpaper or steel wool. Only for the most delicate pieces of wood will you use the very finest grades available. Usually, a medium grade will work well for most of the wood you're likely to finish.

In sanding, remember to always sand with the grain—in the same direction that the grain runs. Sanding against the grain will scratch the wood and detract from its appearance. Also be careful not to round off your edges when sanding, unless you need or want this rounded effect.



Grain of wood

On larger wooden surfaces (like a desktop or tabletop) you may choose to use a power sander. Be careful not to gouge the wood with the edge of the sander. And, as in sanding by hand, be sure to follow the grain of the wood.

Once all the surface areas of your project have been sanded enough so that they feel smooth when you run your hand across them, you're ready to finish the project.

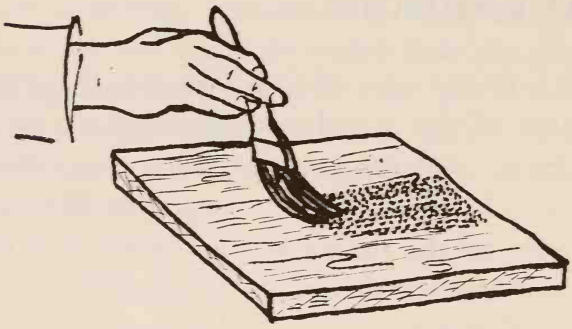
STAIN AND VARNISH

By far, the most popular type of finish for wood is stain and varnish. Most of the wooden objects within your home have received this treatment—from end tables and bookshelves to kitchen cabinets and even the casings or frames around the doors and windows. But remember that stains and varnishes are dangerous chemicals that must be handled with care. Many give off irritating fumes, so be sure you have a window cracked open when working with them.

Read all directions carefully. Always mix each of the liquids before starting. Seal the cans when you're finished. Wipe up spills and splashes quickly, preferably with a rag treated with a little benzine, turpentine, or brush cleaner.

Warning: Since all these products are oil-based, they're extremely flammable. Never use them near flames from stoves, gas furnaces, or hot water heaters. And never allow anyone to smoke near your work area.

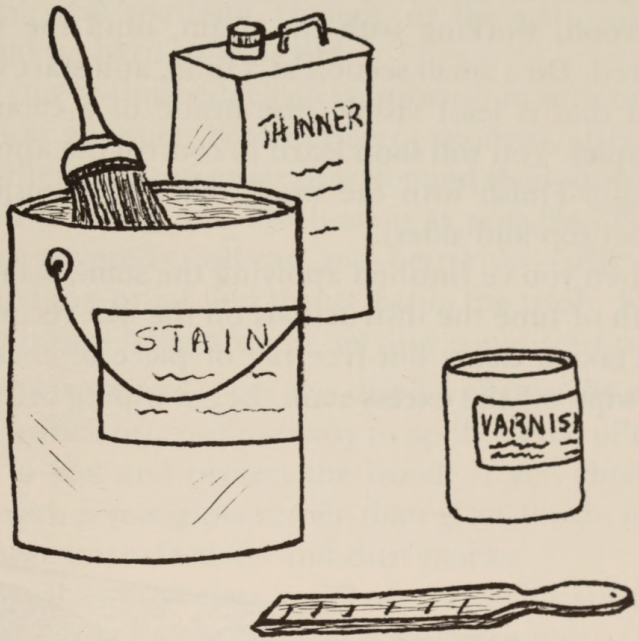
The really nice thing about wood stain is that it colors wood; it doesn't cover it. Commercial wood stains range in colors from light to dark natural wood tones all the way to brilliant reds, blues, greens—just about any color imaginable.



Applying stain with brush

Stain is often applied with a brush, although you can also lay it on with a sponge or even a neatly folded cloth. After the stain is allowed to set on the wood for a while until it reaches the color you want, it must be wiped with a clean rag to remove the excess and allow the natural grain of the wood to show through.

Before beginning to stain, you should have a mixing stick. Many paint stores and hardware stores give them away with the purchase of paint or stain. You also need paintbrushes or sponge or cloth, wiping rags or cheesecloth, rubber gloves to protect hands from messy stain, and newspapers for covering your work area. Use a soft,



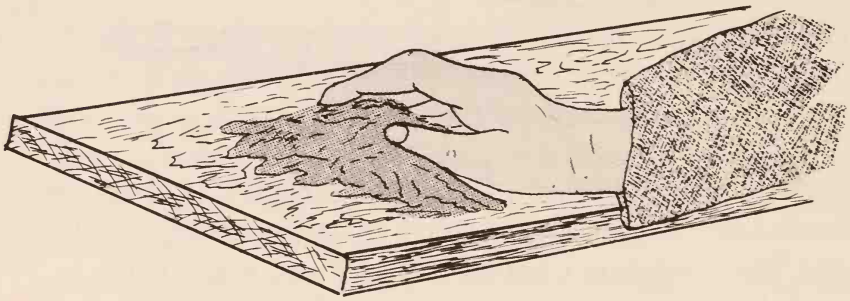
dry sponge or a large, dry paintbrush for dusting the sanded particles from the wood prior to staining. In that way, the stain won't become dirty from wood dust.

With your work area covered with newspapers, read the directions on the can of stain, paying particular attention to how long the manufacturer suggests the stain be left on the wood before wiping. Then open the can with a can opener, nail, or old knife. Mix the stain care-

fully, pulling up the substance that has settled to the bottom and working it into the rest of the stain.

Next, dip your brush (or other applicator) in the stain and shake off the excess into the can. Apply the stain to the wood, working with the grain, until the wood is covered. Do a small section at a time, and start with the wood that is least visible (the inside of a cabinet, for example). You will soon learn to control the application of stain. Finish with the wood that's most visible (the cabinet top and sides).

When you've finished applying the stain, wait for the length of time the instructions on the can recommend, then take a clean, lint-free rag or piece of cheesecloth and wipe off the excess stain. Begin wiping off the first



Wipping off excess stain

section that you stained, and end wiping off the last section you stained. If the color isn't dark enough to suit you, you can apply a second coat of stain or simply wait a little longer between applying the stain and wiping it off. Don't wait too long, though, or the stain will get sticky and be hard to wipe off.

Once you've finished, clean your brush in solvent and throw away any stain, soaked rags or sponges, after first soaking them in a can or jar of water and then squeezing them out to remove as much stain as possible. Throw them in a covered trash can, or—better yet—seal them in a closed can or jar and throw *that* in the trash. Never leave stain rags lying around, or they could start a fire.

After your stained piece has dried well (usually overnight is sufficient), you're ready to apply a coat of clear varnish to seal and protect the wood. If you choose a varnish with a semigloss rather than gloss finish, it will show fewer imperfections and dust marks.

To varnish your project, you'll need a mixing stick and a natural bristle brush. Natural bristles are more effective with varnish than the softer nylon bristles. Use the same solvent you used for cleaning up after staining (turpentine, benzine, etc.).

When you mix the varnish, do so as gently as possible so that you don't create tiny air bubbles in the liquid. Bubbles have a way of working themselves onto the varnished wood and popping as it dries, leaving tiny craterlike indentations on the surface. For this reason, *never shake* a can of varnish prior to applying.

Just prior to applying the varnish, wipe the wood with a *track rag*. You can buy one at a paint store or make one yourself by simply sprinkling a little varnish on a small piece of cloth (lintfree cloth, please!). Squeeze the rag to work the varnish through it, and then dust the wood carefully with the tack rag to pick up every last bit of dust and dirt that might mar the surface of the varnished wood.

When you're finished with the rag, store it in a tightly closed jar for safety's sake.

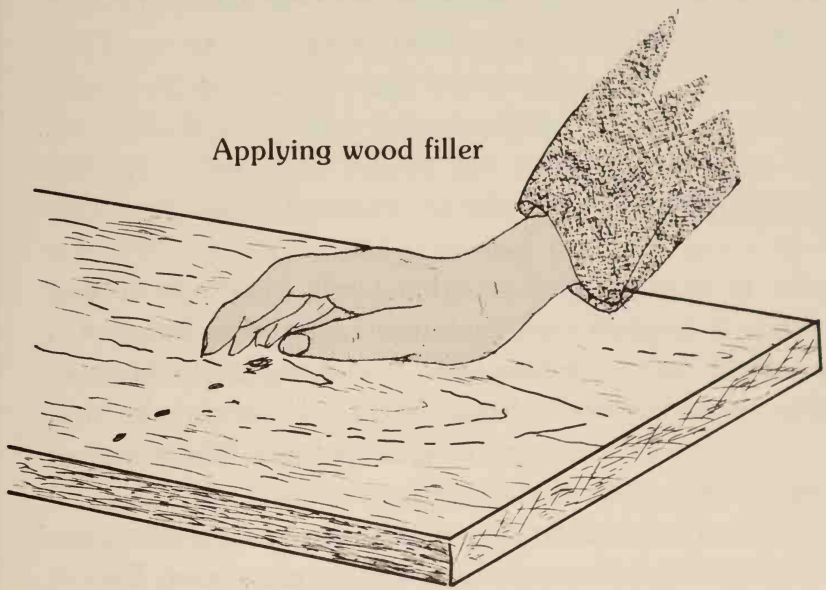
Next, dip your brush in the varnish and apply the liquid fairly thickly to the surface of the wood. First brush with the grain, then against the grain to get any spots you might have missed. Wait four or five minutes for the varnish to "set up," or start getting tacky, and then (with as dry a brush as possible) brush one final time with the grain to "pull off" excess varnish that might run or sag and spoil the appearance of the wood.

Allow the coat of varnish to dry thoroughly. Read the label on the can for approximate time. Varnish dries more quickly in warm temperatures and in dry air. While the varnish is drying, keep your brush soft by placing it in a container of solvent.

When the first coat of varnish is completely dry, you can fill any countersunk nail holes and other indentations in the wood. It's a good idea to wait to putty until the first coat of varnish is on so that the putty doesn't dirty the surrounding wood.

Use putty that's fairly closely matched to the color of

the stained wood (dark putty for dark wood, light putty for light wood). Taking a piece of putty in your hand, press some into the nail hole with your thumb, then slide your thumb along the wood to remove the excess putty. If the putty pulls right out of the hole, again as you remove your thumb, you're lifting your thumb off the wood instead of *sliding* it away from the hole.



Applying wood filler

Once all nail holes are puttied and the excess putty wiped clean, take very fine sandpaper or steel wool and, going with the grain, lightly sand the varnished surface of the wood. Dust the wood with a dry brush or sponge

and finally dust it with a tack rag. Then apply a second coat of varnish to seal in the filler and also add protection to the wood.

Once you're finished varnishing, be sure to clean your brush well in solvent. Dip, stir, and squeeze it out time and time again. It's a good idea to change solvent toward the end of the cleaning process, discarding the old solvent and using new. Finally, when all varnish seems to be out of the bristles, squeeze-dry the brush and store it flat to dry in a well-ventilated area.

SHELLAC

Shellac is used to give wood a hard, clear, protective coating. It is preferred by some carpenters because it dries faster than varnish, and you can see the texture and grain of the wood through it. However, it is hard to work. Dust, in the air or on your project, has a way of showing up on the shellacked surface.

You need several coats—usually about five, but since it dries so fast you can apply one coat every hour. Do not shake shellac or it will form bubbles which can ruin the coating!

Apply slowly and evenly on a *clean* surface with a soft, wide brush. If it needs thinning out, put some alcohol in it, then stir slowly. After putting on one coat, sand the surface with a fine-grain sandpaper, clean, then apply

the next coat. Let your wood dry for about 24 hours after the last coat in a dust-free area. Then apply a good furniture wax. Your wood should come up shiny, smooth and beautiful.

Paint. There are countless colors of paint on the market—every color in the rainbow, and then some—from whitest white to deepest black. But choosing a color is only the beginning of your decision once you've decided to paint your project.

There are basically two types of paints to choose from—oil base and water base, or latex. Oil-base paints are soluble in special solvents (just like stains and varnishes). Waterbase paints are soluble in water. That makes cleaning brushes, hands, and anything else that received an accidental spraying of latex paint easier than if you used oil-based paint.

In addition, paint comes in either indoor or outdoor types. If your project is destined to sit outdoors, use outdoor paint, which has a more durable, weather-resistant surface than indoor paint.

Then, too, there's the question of sheen. Most paint comes in high gloss, semi-gloss, or flat versions. While gloss is the easiest to clean, flat shows fewer fingerprints and other marks.

In general, many people painting a variety of wooden surfaces lean toward either indoor or outdoor latex paint in a semi-gloss finish. Unless you have special needs in a paint, you probably won't go wrong doing likewise.

Painting a wooden surface is as easy as dipping a brush in a can of paint and spreading it around. For starters, use a nylon bristle brush for paint or a natural bristle for oil-based paint. Have a paint-mixing stick for each color of paint you'll be using, and—just as in staining—lay out a layer of newspapers before tackling what could be a messy job.

Since all paint settles, it's important to mix the paint well with the mixing stick before using it. When the color you bring up from the bottom of the can is the same as the rest of the paint, it's properly mixed.

To begin painting, dip the brush in the paint about halfway up the bristles. Wipe off the excess on the inside lip of the can, and carry the brush to the surface to be painted. Begin spreading the paint around, first with the grain, then against, being sure you cover all areas and don't leave any "misses." Don't put the paint on so thick that it sags or drips. But don't put it on so thin that it's hard to get it to cover the wood. A little practice will tell you how much to use.

As in staining, it's best to start painting the least-visible parts of your project and end up painting the most-visible parts. Use the tips of the bristles held at an angle to get paint into tight corners. Stroke flat surfaces lightly and smoothly with long, even strokes. Never "scrub" with the brush, as if you were trying to rub out a mark. That will create an unevenly painted surface and ruin the brush, as well.

After you've applied the first coat of paint, step back

and check for any spots you might have missed. A well-lighted work area is helpful here. When finished, seal the paint can and put your brush in solvent if using oil-based paint, or in a can of water if using latex paint. Never leave a latex-coated brush sitting out in the open for even 15 or 20 minutes, or the paint will begin to dry and harden, ruining the brush.

After the paint for your project has dried, take a good look at whether or not you'll need a second coat. Often with oil paints, you will. Most latex paints, however, have good covering quality with a single coat. Unless the paint looks thin and you can practically see the grain through it, one coat should be plenty. Clean out your tools, put everything away, and throw out the newspapers.

Your project is now finished. All that remains to be done is enjoy. And take pride in knowing that you did it, from start to finish, yourself.

Index

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Carpentry for Kids

- Basketball Backboard
- Desk
- Bookcase
- Ski Rack

You can build all these and lots more with this handy guide to practical carpentry. You'll learn also how to buy what you need intelligently—how to find scrap wood for free—as well as the use of hand tools and the *safe* use of some power tools. Everything is covered from hammering the first nail to applying the finish. With a few tools, some wood, and this book, you'll see how much fun being a carpenter can be.

ABOUT THE AUTHORS

D.J. HERDA was educated at DePaul University, Roosevelt University, and Columbia College, receiving a B.A. in creative writing and journalism. He was a newspaper and magazine editor before becoming a full-time freelance photographer and author. He has written some 15 books for young people and adults, has had two plays produced, and is the writer of a syndicated weekly column on photography.

JUDY BOCK HERDA was born in Pilot Grove, Missouri. She has a degree in nursing and is currently working in a hospital in Madison, Wisconsin. Ms. Herda is also a freelance writer. She enjoys building things, gardening, and photography. D.J. and Judy make their home in Blue Mounds, Wisconsin.

Cover by Elizabeth Woll

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